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ABSTRACT

This bulletin contains the specifications for the reading, writing, and mathematics subtests of the Florida Teacher Certification Examination. The reading test uses the multiple-choice Cloze procedure and consists of ten passages of approximately 100 words selected from textbooks, journals, documents for teachers produced by the State Department of Education, and teachers' manuals for tests in common usage in Florida. A general description of the test is provided along with item specifications, domain of materials to be sampled, and references. Scoring for the writing test will be based on rhetorical quality, structural and mechanical quality, and observance of conventions in writing. Following a general description of the writing test, information is provided on criteria for topic selection and item specification. Examples of writing scored at various levels are presented and references are included. The mathematics test consists of multiple-choice items testing skills in basic computation, interpretation of data, solving measurement problems, and applying mathematics skills to solve real world problems. Item specifications for the mathematics test are provided. (JD)

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The Florida Teacher Certification Examination Bulletin II : The General Education Subtests - Reading, Writing, Mathematics

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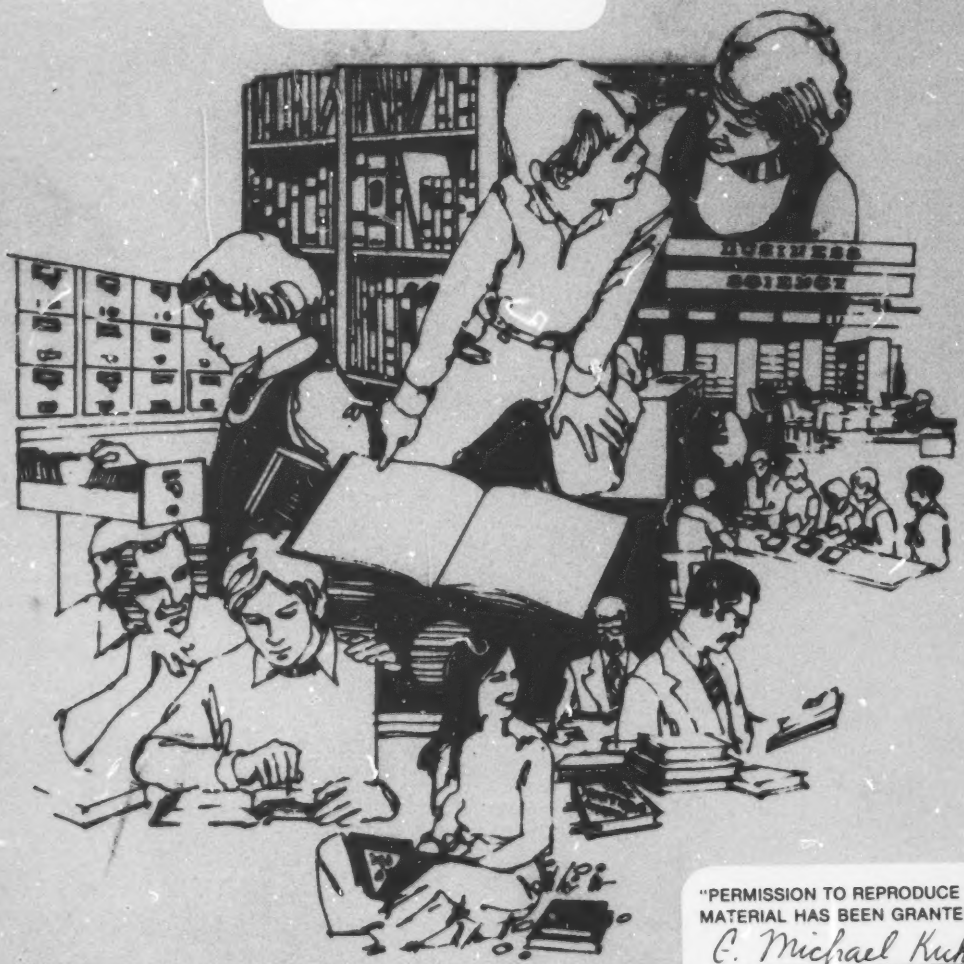

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THE FLORIDA TEACHER CERTIFICATION EXAMINATION

BULLETIN II: THE GENERAL EDUCATION SUBTESTS:

READING, WRITING, MATHEMATICS

AUG 2 5 1980

BULLETIN II: GENERAL EDUCATION SUBTESTS

TABLE OF CONTENTS

	Page
PREFACE	iii
INTRODUCTION	v
A. READING SUBTEST	
- General Subtest Description	3
- Item Specifications	4
- Domain of Materials to be Sampled	7
- References	21
B. WRITING SUBTEST	
- General Subtest Description	27
- Criteria for Topic Selection	27
- Guidelines for Holistic Scoring	27
- Item Specifications	28
- Examples of Writing - Scored at Various Levels	31
- References	37
C. MATHEMATICS SUBTEST	
- Process for the Development of the Specifications for the Mathematics Subtest	47
- Guidelines for the Mathematics Subtest	51
- Item Specifications	53

PREFACE

Three bulletins have been developed to provide information about the Florida Teacher Certification Examination. Bulletin I describes the development of the examination and presents the specifications for each of the subtests. It also provides a list of supplemental materials and references and a set of sample items to illustrate the kind of items which will be used in the examination. Bulletin II provides specifications for the general education subtests in reading, writing, and mathematics. It presents a general description and item specifications for each item in the reading, writing, and mathematics subtest. Bulletin III provides specifications for the professional education subtest of the Florida Teacher Certification Examination. It includes a description of the content base and item specifications for each of the professional items to be included in the examination.

It is expected that faculty members of teacher education programs and students in these programs will be especially interested in Bulletin I. Teacher Education Center and School District Staff Development Directors may also find the information useful. The specific item specifications and other information in Bulletins II and III will probably be of special interest to professionals involved in program development and evaluation.

Please note that the coverage of the examination is limited to the essential generic competencies which are assessable by a written examination. There has been no attempt to cover all aspects of teacher training. Many important competencies are assessable only by direct observation and many competencies are specific to the subject matter taught or the developmental level of the students. It is also important to remember that teacher education is dynamic; it must change to reflect and incorporate new research evidence and wisdom accumulated from experience. For these reasons, even though the examination has been carefully developed and reflects the current state of knowledge and priorities for the general preparation of teachers, the specifications for the examination should not be used as the sole basis for a teacher training program.

The Department of Education encourages professionals to critique and make recommendations to improve the Florida Teacher Certification Examination. Recommendations and inquiries should be addressed to:

Florida Teacher Certification Examination
Office of Teacher Certification
Florida Department of Education
Tallahassee, Florida 32301

INTRODUCTION

This bulletin contains the specifications for the Reading, Writing, and Mathematics subtests of the Florida Teacher Certification Examination.

The history and early development of the examination are covered in Specifications for the Florida Teacher Certification Examination Bulletin I. Bulletin II presents a general description and item specifications for each of the general education subtests. The materials in this bulletin were developed by contractors working under the direction of the Office of Teacher Education of the Florida Department of Education. The contractors' complete reports are on file in the Office of Teacher Certification.

The specifications presented in this bulletin are being used for the 1980-81 examinations. If changes are made in the specifications at some future date, it is anticipated that an up-dated bulletin will be issued.

A. READING SUBTEST

This Section Includes:

1. General Subtest Description
2. Item Specifications
3. Domain of Materials to be Sampled
4. References

READING

-General Subtest Description-

a. The Reading test will use the multiple-choice CLOZE procedure.

b. The test will consist of 10 passages of approximately 100 words, selected from the following sources: (1) textbooks commonly used in required professional education courses, (2) journals and newsletters published by non-specialized teacher organizations, (3) documents for teachers-in-general produced by the State Department of Education, and (4) teachers' manuals for tests in common usage in Florida.

c. Each passage will have 10 words deleted. Deleted words will be nouns, verbs, adjectives or adverbs, not structural words.

d. Examinee will be asked to select the word to fill each deletion from among four choices which are syntactically equivalent but different in meaning.

Subtest: Reading

Competency: 4

Subskills: c, d, e

ITEM SPECIFICATIONS

STATEMENT

Competency: Demonstrate the ability to read, comprehend, and interpret orally and in writing professional material.

Subskills:

c. Demonstrates literal reading skills (such as recognizing main idea, details, sequencing, comparison and contrast).

d. Demonstrates interpretive reading skills, (such as predicting outcome, drawing conclusions, making generalizations).

e. Demonstrates critical reading skills (such as recognition of relevant information, propaganda techniques, and fallacies in reasoning).

GENERAL DESCRIPTION/RATIONALE

Given a passage of written material from which ten lexical (non-structural) words have been deleted, the examinee will select from four choices the correct word to replace each deleted word.

RATIONALE: Research has demonstrated that a modified CLOZE (i.e., deletion of only lexical, not structural, words and a forced choice response) correlates highly with more traditional test of reading comprehension while concentrating on the types of language comprehension skills which the first subtest for this competency call for. The use of this technique also makes it possible to use as test material a sample of the materials which teachers and teacher education students are expected to be able to read.

(SEE ATTACHED REFERENCE LIST)

STIMULUS ATTRIBUTES

1. The stimulus is a passage of at least 100 words selected from the documents included in the domain of reading materials defined in a later section, with words deleted syntactically.

2. Procedure for selection of passage:

   a. Prepare a list of all available documents in a category of the domain and assign each of them a number.

RESPONSE ATTRIBUTES

1. The correct response is the deleted word.

2. Alternatives for each deleted word will be three other words that are syntactically the same but semantically different from it.

3. Alternatives must not be systematically different in length from the correct word.

b. Use a table of random numbers to select a document.

c. Use a table of random numbers to select a page within the document.

d. Begin the test passage with the first paragraph that starts on the relevant page and continue until at least 100 words are obtained and the end of a sentence is encountered.

e. If the relevant page does not contain continuous prose material or is otherwise unsatisfactory (e.g. contains long lists of things, formulas, etc.), find the first following page that contains acceptable material and select the test passage from it.

3. Procedure for deletion of words:

a. Count the number of words in the passage and divide by 10 (N = total words ÷ 10)

b. Use a table of random numbers to select one word in the last five words of the first ten.

c. Use a table of random numbers to select one word in each of the remaining sets of ten words.

d. Delete from the passage the selected word if it is an adjective, adverb, noun, or verb. If not, select the next word forward if it is appropriate. If it is not, move to the word immediately before the original selected word. In this way, move forward and back until an appropriate word is found.

e. Deleted words should be at least five words apart. If, for example, the ninth word in the first ten words and the second word in the second ten words were selected, it would be necessary to replace the word from the second ten with another equally appropriate one.

4. Alternatives must be located within the same thousand words on the word list of Thorndike or Carroll as the correct word.

5. Responses should be ordered randomly.

SUPPLEMENTARY MATERIALS: Definition of the Domain of Materials

The domain of reading materials consists of all documents in the following categories:

a. Textbooks for courses commonly required for programs in undergraduate education in accredited teacher training institutions in Florida.

b. Journals and newsletters published by non-specialized teacher organizations and teacher unions whose membership embraces all K-12 teachers.

c. Documents for teachers in general produced by the State Department of Education.

d. Teacher's manuals for tests in common usage in Florida.

Domain Of Materials To Be

Sampled For Reading Subtest

DOMAIN of MATERIALS
SAMPLED for READING SUBTEST

A. TEXT BOOKS

1. HISTORY, PHILOSOPHY, SOCIAL FOUNDATIONS, SCHOOL LAW

Allen & Mecat - Controversies in Education
W. B. Saunders, 1974 (ECKERD)

Battle & Shannon - The New Idea in Education
Harper & Row, 19[illegible] (USF)

Raeb, M. - Cloud Nine
Philosophy Library of New York City, 1976 (USF)

Brademeier, M. E. & M. C. - Social Forces in Education
Alfred Publishing Co., 1978 (UF)

Clark, K. - Dark Ghetto: Dilemmas of Social Power
Harper & Row, 1965 (FAMU)

Corwin, R. G. - The Sociology of Education: Emerging Patterns of Class, Status and Power in the United States
Appleton-Century-Crofts, 1965 (FAMU)

Dickson - Future File
Avon Books, 1977 (USF)

Donley, M. O., Jr. - Power to the Teacher: How America's Educators Became Militant
Indiana U. Press, 1976 (USF)

Fain, S., Shostak, R., & Dean, J. - Teaching in America
Scott, Foresman, & Co., 1979 (FIU)

Fantini, M. & Weinstein, G. - The Disadvantages: Challenge to Education
Harper & Row, 1968 (FAMU)

Goldstein, B. - Low Income Youth in Urban Areas: A Critical Review of Literature
Holt, Rinehart, & Winston, 1967 (FAMU)

* Institutions using is indicated in parenthesis

Gordon, E. M. & Wilkerson, D. A. - Compensatory Education for the Disadvantaged: Programs and Practices - Pre-school Through College
College Entrance Examination Board, 1966 (FAMU)

Grambs, J. D. - Schools, Scholars, and Society (Rev. Ed.)
Prentice-Hall, 1978 (FSU) (FAU)

Gutek - Historical Introduction to American Education
T. Y. Crowell, 1970 (FAU)

Hall - Beyond Culture
Anchor Doubleday, 1977 (USF)

Havighurst, R. & Levine, D. - Society and Education
Allyn and Bacon, 1973 (JU)

Johansen, J. H. et al - American Education, an Introduction to Teaching (3rd Ed.)
Wm. C. Brown, 1979 (FIT)

Johansen, J. H., Collins, H. W., Johnson, J. A. - American Education - The Task and the Teacher (2nd Ed.)
Wm. C. Brown, 1978 (FLAGLER)

Johnson, J. - Introduction to the Foundations of Education (4th Ed.)
Allyn and Bacon, 1979 (UM) (FSC)

Kassof - The Soviet Youth Program
No publisher, no date (UF)

Kneller - Introduction to the Philosophy of Education
J. Wiley, 1971 (FAU)

Lemley, C. R. - Johnny Knows the Law, Do You?
The University of West Florida, 1978 (UWF)

Mason, R. E. - Contemporary Educational Theory
David McKay, 1972 (UF)

Menaker, J. & Pollack, E. - Emerging Educational Issues
Little, Brown, & Co., 1974 (FIT)

Miller, H. L. - Social Foundations of Education: An Urban Focus
Holt, Rinehart, & Winston, 1978 (USF)

Moms, V. C. & Pai, Y. - Philosophy and the American School
Houghton Mifflin, 1976 (BARRY)

Prichard, K. W. & Buxton, T. - Concepts and Theories in Sociology of Education
Professional Ed. Publications, 1973 (NOVA)

Reutter, E. E., Jr. & Hamilton, R. R. - The Law of Public Education
The Foundation Press, 1979 (U. TAMPA)

Ross, F. - Trouble in School
Avon, 1979 (USF)

Schultz, F. - Education
Dushkin Publishing Co., 1979 (U. MIAMI)

Strickland, R., Phillips, J. F., & Phillips, W. R. - Avoiding Teacher Malpractice: A Practical Legal Handbook for the Teaching Profession.
Hawthorn Books, 1976 (U. TAMPA)

Swift, D. W. (ed.) - American Education: A Sociological View
Houghton-Mifflin, 1976 (ROLLINS)

Tyack, D. B. - Turning Points in American Educational History
Blaisdell, 1967 (UF)

Van Scotter - Foundations of Education: Social Perspectives
Price, 1979 (USF)

Welton, D. A. - Realms of Teaching: An Introduction to American Education
Rand McNally, 1979 (ST. LEO)

Wingo, M. G. - Philosophies of American Education
Heath, 1974 (USF)

Worshofsky - Doomsday
Pocketbooks, 1977 (USF)

Wynn, DeYoung, Wynn - American Education (8th Ed.)
McGraw Hill, 1977 (WARNER SOUTHERN)

2. METHODS

AAAS - Science Methods for Elementary Teachers
Zerox Corp., 1970 (ROLLINS)

Alexander, W. M. - The High School in the Future
Charles E. Merrill, 1968 (FAMU)

Amidon, E & Hunter, E. - Improving Teaching
Rinehart & Winston, 1966 (FAMU)

Anderson, P. S. & Lapp, D. - Language Skills in Elementary Education
MacMillan Publishing Co., 1979 (UNIV. of TAMPA)

Anderson & Van Dyke - Secondary School Administrations
Houghton-Mifflin, 1972 (WARNER SOUTHERN)

Blitz, B. - The Open Classroom: Making it Work
Allyn and Bacon, 1973 (FAMU)

Bruner, J., et al - Studies in Cognitive Growth
John Wiley & Sons, 1967 (FAMU)

Burmeister, L. E. - Reading Strategies for Middle and Secondary School Teachers
Addison Wesley, 1978 (FLAGLER)

Cain, S. E. & Evans, J. M. - Sciencing - An Involvement Approach to Elementary Science Methods
Charles E. Merrill, 1979 (WARNER SOUTH.) (ROLLINS)

Cartwright, C. A. & Cartwright, P. G. - Developing Observation Skills
McGraw-Hill Book Co., 1974 (FAMU)

Callahay & Clark - Teaching in the Secondary School
MacMillan, 1977 (WARNER SOUTH.)

Chastain, K. - Developing Second Language Skills
Rand McNally, 1976 (UNIV. of FLORIDA)

Clarizio, H. - Toward Positive Classroom Discipline
John Wiley & Sons, 1971 (FIU)

Commager, A. S. - The People and Their Schools
Phi Delta Ka-pa Educational Foundation (Bloomington, Indiana) 1976 (UNIV. OF W. FLORIDA)

Cooper, J. M. et al - Classroom Teaching Skills: A Handbook
D. C. Heath & Co., 1977 (UNIV. OF W. FLORIDA)

Cooper, J. M. & Ryan, K. - Those Who Can Teach
Houghton-Mifflin Co., 1975 (UNIV. OF W. FLORIDA)

Corwin, R. G. & Edelfelt, R. A. - Perspectives on Organizations - Viewpoints for Teachers
American Association of Colleges for Teacher Education (Washington, D. C.) 1976 (UNIV. OF W. FLORIDA)

Cremin, L. - The Transformation of the School
A Vintage Book (Alfred A. Knopf), 1961 (FAMU)

Croft, D. J. & Hess, R. - An Activities Handbook for Teachers of Young Children
Houghton-Mifflin, 1975 (ECKERD)

Dechant, E. - Reading Improvement in the Secondary School
Prentice-Hall, 1973 (FIT)

DeYoung, C. A. & Wynn, R. - American Education
McGraw-Hill, 1968 (FAMU)

Douglas, H. R. - The High School Curriculum
Ronald Press Co., 1964 (FAMU)

Dunn, R. & Dunn, K. - Teaching Students Through Their Individual Learning Styles: A Practical Approach
Reston Publishing Co., 1978 (FLAGLER)

Eldon, E. - Locating and Correcting Reading Difficulties
Charles Merrill, 1977 (FSC)

Ewigaud, J. (Ed) - Developing Teaching Competencies
Prentice-Hall, 1971 (NOVA)

Forgan, H. W. & Mangrum, C. - Teaching Content Area Reading Skill
Charles Merrill, 1976 (FSC)

Foster, W. S. & Jacobs, N. (Eds) - The Beginning Elementary Teacher
Burgess Publishing Co., 1970 (UNIV. OF W. FLORIDA)

Freiber, Cooper, & Ryan - Those Who Can Teach: A Learning Guide
Houghton-Mifflin Co., 1977 (UNIV. of W. FLORIDA)

Freire, P. - Pedagogy of the Oppressed
Seaburg Press, 1970 (FLAGLER)

Funk, H. D. & Olberg, R. T. - Learning to Teach in the Elementary School: Introductory Readings
Dodd, Mead, & Co., 1971 (UNIV. of W. FLORIDA)

Gaitskell, C. D. - Children and Their Art
Harcourt Brace Jovanovich, Inc., 1975 (WARNER SOUTH.)

Ginott, H. - Teacher and Child
(Avon) MacMillan, 1972 (FSC) (UNIV. of NO. FLORIDA)

Gordon, T. - Teacher Effectiveness Training
David McKay, 1974 (FSC)

Gramks, J. D. & Carr, J. - Modern Methods in Secondary Education
Holt, Rinehart, & Winston, 1979 (FAMU)

Gregory, T. B. - Encounters With Teaching
Prentice-Hall, 1972 (FIT)

Gruttner, F. M. - Teaching Foreign Language
Harper & Row, 1969 (UF)

Hall, Ribovich, & Ramig - Reading and the Elementary School Child
D. Van Nostrand, 1979 (FSC)

Hallahan, D. P. & Kauffman, J. M. - Exceptional Children
Prentice-Hall, 1978 (FSC)

Hand, H. - Principles of Public Secondary Education
Ronald Press Co., 1958 (FAMU)

Hass, G., Bondi, J., & Miles, J. - Curriculum Planning: A New Approach
Allyn and Bacon, 1974 (FAMU)

Havighurst, R. & Neugarten, B. - Society and Education
Allyn and Bacon, 1975 (FAMU)

Heilman, A. W. - Principles and Practices of Teaching Reading
Charles E. Merrill, 1977 (FLAGLER) (UNIV. of TAMPA)

Henry & Beasley - Supervising Student Teachers
Sycamore Press, 1977 (ECKERD)

Hertzler, J. O. - The Sociology of Language
Random House, 1965 (FAMU)

Hill, W. R. - Secondary School Reading
Allyn and Bacon, 1979 (JACKSONVILLE UNIV.)

Hillson, M. - Change & Innovation in Elementary School Organization
Holt, Rinehart, & Winston, 1965 (FAMU)

Hipple, T. W. - Secondary School Teaching Problems & Methods
Goodyear Publishing Co., 1970 (FAMU)

Hoover, K. H. - The Professional Teacher's Handbook
Allyn and Bacon, 1976 (ECKERD)

Hunt, T. McV. - Intelligence and Experience
Ronald Press, 1961 (FAMU)

Inlow, G. M. - Maturity in High School Training
Prentice-Hall, Inc., 1970 (FAMU)

Jackson, P. W. - Life in Classrooms
Holt, Rinehart, & Winston, Inc., 1968 (FAMU)

Jarolimek, J. & Foster, C. D. - Teaching and Learning in the Elementary School
MacMillan Publishing Co., 1976 (ECKERD)

Johnston, E. & Faunce, R. - Student Activities in the Secondary School
Ronald Press Co., 1952 (FAMU)

Joiner, E. & Westphal, P. (Eds) - Developing Communication Skills
Newbury House Publishers, 1978 (UF)

Kahle, J. B. - Teaching Science in the Secondary School
D. Van Nostrand, 1979 (FIT)

Kennedy, E. C. - Classroom Approaches to Remedial Reading
F. E. Peacock, 1977 (FSC)

Kim, E. & Kellough, R. - A Resource Guide for Secondary School Teaching
MacMillan Publishing Co., 1978 (UNIV. of TAMPA) (FSC) (FIT) (UNIV. of MIAMI)

Kindes, J. S. - Using Instructional Media
D. Van Nostrand, 1973 (WARNER SOUTH.)

Krug, E. A. - The Secondary School Curriculum
Harper & Row, 1960 (FAMU)

Lamb, P. & Arnold, R. - Reading: Foundations and Instructional Strategies
Wadsworth Publishing Co., 1976 (UNF)

Landreth, C. - Early Childhood: Behavior and Learning
Alfred A. Knopf, 1967 (FAMU)

Lapp, D. & Flood, J. - Teaching Every Child to Read
MacMillan Publishing Co., 1978 (ECKERD)

Larson, K. - School Discipline in an Age of Rebellion
Parker Publishing Co., Inc., 1972 (FAMU)

Lorenz, Konrad - Evolution and Modification of Behavior
University of Chicago Press, 1965 (FAMU)

Mager, R. F. - Preparing Instructional Objectives
Fearon Publishing Co., 1975 (UNF)

Michaelis - Social Studies for Children in a Democracy (6th Ed.)
Prentice-Hall, 1976 (WARNER SOUTH.)

Moss, Theodore - Middle School
Houghton-Mifflin Co., 1969 (FAMU)

National Study of School Evaluation - Evaluation Criteria for the Evaluation of Secondary
National Study of School Evaluation, 1978 (FAMU)

Nelson, A. - Developmental Objectives and Instructional Techniques
Mimeo, 1979 (FAU)

Packard, R. G. - Education and Teaching: 21 Performance Based Units For An Introduction to Education
Charles E. Merrill, 1974 (USF)

Palardy, J. M. - Elementary School Curriculum: An Anthology of Trends And Challenges
MacMillan Publishing Co., 1971 (FAMU)

Petty, W. F. (Ed) - Curriculum for Modern Elementary School
Rand McNally College Publishing Co., 1976 (FAMU)

Petty, W. T., Petty, D. C., & Becking, M. F. - Experience in Language: Tools and Techniques for Language Arts Methods
Allyn and Bacon, 1973 (FAMU)

Piaget, J. (Translated by D. Cotzman) - Science of Education And The Psychology Of The Child
Orion Press, 1970 (FAMU)

Popham, D. F. - Foundations of Secondary Education: Historical, Comparative, and Curricular
Burgess Publishing Co., 1969 (FAMU)

Popham, W. J. & Baker, E. L. - Planning and Instructional Sequence
Prentice-Hall, 1970 (USF) (FIU)

Popham, W. J. & Baker, E. L. - Classroom Instructional Tactics
Prentice-Hall, 1973 (USF)

Popham, W. J. & Baker, E. L. - Systematic Instruction
Prentice-Hall, 1970 (USF) (FIU)

Porody, O. F. - The Principal and Staff Deal With Discipline
Teachers College Press, 1965 (FAMU)

Postman, N. & Weingartner, C. - The School Book
Dell Publishers, 1973 (FSC)

Ragan, W. & Shepherd, G. - Modern Elementary Curriculum
Holt, Rinehart, & Winston, 1977 (FSC)

Ragan, W., Wilson, J., & Ragan, T. - Teaching in the New Elementary School
Holt, Rinehart, & Winston, 1972 (FAMU)

Ranson, C. A. - Preparing to Teach Reading
Little Brown and Co., 1978 (UF)

Reid - Teaching Speech
McGraw-Hill, 1971 (WARNER SOUTH.)

Renner, J. W. - Guiding Learning in the Elementary School
Harper & Row, 1973 (FAMU)

Rice, D. L. - Classroom Behavior From A to Z
Pearon Publishers, 1974 (FAMU)

Roe, B. D., Stoodt, B. D., & Burns, P. C. - Reading Instruction in The Secondary School
Rand McNally, 1978 (UNIV. of TAMPA)

Rogers, C. R. & Coulson, W. R. (Eds) - Freedom to Learn
Charles E. Merrill, 1969 (FLAGLER)

Romine, S. - Building the High School Curriculum
Ronald Press Co., 1954 (FAMU)

Ryans, D. C. - Characteristics of Teachers
American Council on Education, 1960 (FAMU)

Saylor, J. G. & Alexander, W. M. - Curriculum Planning for Schools
Holt, Rinehart, & Winston, 1974 (ROLLINS)

Silkerman, C. E. - Crisis in the Classroom
Random House, 1970 (FAMU)

Silkerman, C. E. (Ed) - The Open Classroom Reader
Random House, 1973 (FAMU)

Simpson, E. A. - Helping High School Students Read Better
Science Research Associates, Inc., 1954 (FAMU)

Smith, C. B. - Teaching Reading in Secondary School Content Subjects
Holt, Rinehart, & Winston, 1978 (JACKSONVILLE UNIVERSITY)

Smith, F. R. & Cox, C. B. - Secondary Schools in a Changing Society
Holt, Rinehart, & Winston, 1976 (UNIV. of MIAMI)

Stallings, Jane A. - Learning to Look: A Handbook on Classroom Observation and Teaching Methods
Wadsworth Publishing Co., 1977 (FAMU)

Stone, J. & DeNevi, D. - Teaching Multi-Cultural Populations
Holt, Rinehart, & Winston, 1971 (FIU)

Storen, H. F. - The Disadvantaged Early Adolescent: More Effective Teaching
McGraw-Hill, 1968 (FAMU)

Sutherland & Anbuthnot - Children and Books (5th Ed)
Scott, Foresman, & Co., 1977 (WARNER SO.)

Teiv, H., Karplus, R., & Knott, R. - Material Objects
Rand McNally, 1978 (ROLLINS)

Torrance, P. E. - Guiding Creative Talent
Prentice-Hall, 1962 (FAMU)

Troutman & Lichtenberg - Mathematics: A Good Beginning
Brooks/Cole Publishing Co., 1977 (WARNER SO.)

Trump, J. L. & Miller, D. F. - Secondary School Curriculum Improvement
Allyn & Bacon, 1979 (FSC)

Tyler, R. W. - Basic Principles of Curriculum Instruction
The University of Chicago Press, 1969 (UNIV. of W. FLA.)

Uhl, W. L. - Secondary School Curriculum
The MacMillan Co., 1927 (FAMU)

VanTil, W. - Secondary Education: School and Community
Houghton-Mifflin, 1978 (FAMU)

Venable, T. C. - Patterns in Secondary School Curriculum
Harper and Brothers, 1958 (FAMU)

Wiles, J. & Bondi, J. - Curriculum Development: A Guide to Practice
Charles E. Merrill, 1979 (USF)

Wiles, K. & Patterson, F. - The High School We Need
Association for Supervision and Curriculum Development
1959 (FAMU)

Wilson, R. M. & Hull, M. A. - Programmed Work Attack for Teachers
Charles E. Merrill, 1974 (UNF)

Wittich & Schuller - Instructional Technology: Its Nature and Use
Harper & Row, 1979 (FSU)

------- Elementary Science Study
Houghton-Mifflin, 1965 (ROLLINS)

3. MEASUREMENT

Bauernfeind, R. H. - Building a School Testing Program
Houghton-Mifflin, 1963 (FAMU)

Chase, C. I. - Measurement for Educational Evaluation
Addison Wesley Publishing Co., No Date (USF)

Collins, H. W., Johansen, J. H., & Johnson, J. A. - Educational Measurement and Evaluation
Scott, Foresman, & Co., 1969 (FLAGLER) (USF)

Gronlund, N. E. - Constructing Achievement Tests
Prentice-Hall, Inc., 1968 (FIU) (UNF) (ST. LEO) (FAU)

Hills, J. R. - Measurement and Evaluation in the Classroom
Charles E. Merrill, 1976 (FAMU)

Lien, A. J. - Measurement and Evaluation of Learning
Wm. C. Brown, 1976 (FIT) (USF)

Lindvall, C. M. & Nitko, A. J. - Measuring Pupil Achievement and Aptitude
Harcourt Brace Jovanovich, 1975 (NOVA) (FAMU)

Mehrens, W. A. & Lehmann, I. J. - Standardized Tests in Education
Holt, Rinehart, & Winston, 1975 (USF)

Noll, V. H. - Introduction to Educational Measurement
Houghton-Mifflin Co., 1965 (FAMU)

Stanley, J. C. & Hopkins, K. D. - Educational and Psychological Measurement and Evaluation
Prentice-Hall, Inc., 1972 (FAMU)

Thorndike, R. L. & Hagen, E. - Measurement and Evaluation in Psychology and Education
John Wiley & Sons, 1969 (UNIV. of TAMPA) (USF)

Turney, B. L. & Robb, G. P. - Statistical Methods for Behavioral Science
Intex Educational Publishers, No Date (USF)

Carmel, L. J. - Measurement and Evaluation in the Schools
MacMillan Publishing Co., 1970 (USF)

Administrator's Manual, etc. - California Test & Basic Skills

Administrator's Manual, etc. - Metropolitan Achievement Tests

Administrator's Manual, etc. - Stanford Achievement Tests

4. EDUCATIONAL PSYCHOLOGY

Anderson, R. C. & Faust, G. - The Science of Instruction and Learning
Dodd, Mead, 1973 (FSC)

Ausubel, D. P. - Educational Psychology - A Cognitive View
Holt, Rinehart, & Winston, 1968 (FAMU)

Ausubel, D. P. & Robinson, F. - School Learning
Holt, Rinehart, & Winston, 1979 (UNIV. of TAMPA)

Azaroff, B. S. & Mayer, G. R. - Applying Behavior Analysis Procedures With Children
Holt, Rinehart, & Winston, 1977 (USF)

Benard, H. W. - Psychology of Learning and Teaching
McGraw-Hill Book Co., 1972 (FAMU)

Biehler, Robert - Psychology Applied to Teaching
Houghton-Mifflin, 1978 (NOVA) (FAU) (FLAGLER) (JACKSONVILLE UNIV.)

Bigge, M. L. - Learning Theories for Teachers
Harper & Row, 1976 (WARNER SO.)

Blackham, G. I. & Silberman, A. - Modification of Child and Adolescent Behavior
Wadsworth Publishing Co., Inc., 1975 (FLAGLER)

Canfield, J. & Wells, H. C. - 100 Ways to Enhance Self-Concept in The Classroom
Prentice-Hall, 1976

Charles, C. M. - Educational Psychology: The Instructional Endeavor
Mosby, 1976 (FAMU)

Craig, R. C. - Contemporary Educational Psychology: Concepts, Issues, and Applications
Wiley Publishers, 1975 (FAMU)

DeCecco, J. P. - The Psychology of Learning & Instruction: Educational Psychology
Prentice-Hall, 1968 (FAMU)

DeCecco, J. P. & Crawford, W. - The Psychology of Learning and Instruction: Educational Psychology
Prentice-Hall, 1974 (UNIV. of TAMPA)

Silvesta & Thompson, G. - Educational Psychology: Instruction And Behavioral Change
Appleton-Century-Crofts, 1970 (FAMU)

Gage & Berliner & Bierley - Educational Psychology and the Study Guide
Rand McNally, 1979 (USF) (UF)

Gibson - Psychology for the Classroom
Prentice-Hall, 1979 (ROLLINS)

Glasser, W. - Schools Without Failure
Harper & Row, 1969 (FLAGLER)

Good & Brophy - Educational Psychology: A Realistic Approach
Holt, Rinehart, & Winston, 1977 (ECKERD)

Gordon, T. - T. E. T. (Teacher Effectiveness Training)
Alfred A. Knopf, Inc., 1974 (FLAGLER)

Greenberg, H. M. - Teaching With Feeling
Pegasus, 1969 (UNF)

Guardo, C. J. - The Adolescent as Individual: Issues and Insight
Harper & Row, 1975 (UF)

Hamachek, D. - Encounters With Self
Holt, Rinehart, & Winston, 1971 (FIU)

Hergenhahn, B. R. - An Introduction to Theories of Learning
Prentice-Hall, Inc., 1976 (UNF)

Hetherington, E. M. & Parke, R. D. - Child Psychology: A Contemporary Viewpoint
McGraw-Hill Book Co., 1979 (FSC)

Holmes, D. L. & Morrison, F. J. - The Child - An Introduction to Developmental Psychology
Brooks/Cole, 1979 (FLAGLER)

Homme, L. - How To Use Contingency Contracting In The Classroom
Research Press, 1976 (USF)

Hurlock, E. - Child Development
McGraw-Hill Book Co., 1978 (ECKERD)

Kennedy, W. A. - Child Psychology
Prentice-Hall, 1975 (FSU)

Krumboltz, J. D. & Krumboltz, H. B. - Changing Children's Behavior
Prentice-Hall, 1972 (UNF)

LaFrancois - Psychology for Teaching: A Bear Always/Usually Faces Front
Wadsworth Publishing Co., 1978 (USF)

Lafrancois, G. R. - Psychological Theories and Human Learning: Kongor's Report
Brooks/Cole, 1972 (JACKSONVILLE UNIV.)

LaRey, R. & Johnson, M. - Psychology for Instruction
Scott, Foresman, & Co., 1978 (FIT)

Malott - Contingency Management
Behaviordelia, 1970 (USF)

Mouly, G. J. - Psychology for Effective Teaching
Holt, Rinehart, & Winston, 1973 (BARRY)

O'Connell, V. & O'Connell, A. - Choice and Change
Prentice-Hall, 1974 (JACKSONVILLE UNIV.)

Ouanty, C. & Davis, A. - Observing Child: A Child Development Manual
Alfred Polshing, 1974 (FSC)

Owen, S., Blount, H. P., & Moscow, H. - Educational Psychology: An Introduction
Little, Brown, & Co., 1978 (FAMU)

Pitts, C. E. - Introduction to Educational Psychology: An Operant Conditioning Approach
Crowell Publishers, 1971 (FAMU)

Sprinthall, R. C. & Sprinthall, N. A. - Educational Psychology: A Developmental Approach
Addison Wesley, 1976 (UNIV. of MIAMI) (UF)

Stone, L. J. & Church, J. - Childhood and Adolescence: A Psychology of the Growing Person
Random House, 1979 (ST. LEO) (JACKSONVILLE UNIV.)

VanderZanden, J. W. - Human Development
Knopf, 1978 (UNF)

Vargas, J. S. - Behavioral Psychology for Teachers
Harper & Row, 1977 (USF)

Yussen, S. R. & Santrock, J. W. - Child Development: An Introduction
William C. Brown, 1978 (UNIV. of FLORIDA)

B. DOMAIN OF LIBRARY JOURNALS

AMERICAN SCHOOL & UNIVERSITY	(370.5 A 5132)
AMERICAN TEACHER	(370.5 A 51271)
AUDIO - VISUAL INSTRUCTION	(370.5 A 9122)
EDUCATION	(370.5 E 24)
EDUCATION & URBAN SOCIETY	(370.5 E 2414)
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EDUCATIONAL STUDIES	(370.5 E 2495)
THE ELEMENTARY SCHOOL JOURNAL	(370.5 E 38)
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JOURNAL OF TEACHER EDUCATION	(370.5 J 868)
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PEABODY JOURNAL OF EDUCATION	(370.5 P 352)
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TEACHER	(370.5 G 732)
THEORY INTO PRACTICE	(370.5 T 396)
THRUST FOR EDUCATION LEADERSHIP	(370.5 T 531)
TODAY'S EDUCATION	(370.5 N 111)
UNIVERSITIES QUARTERLY	(370.5 V 581)
URBAN REVIEW	(370.5 U 72)
THE VOLTA REVIEW	(370.5 V 936)

18

C. STATE DEPARTMENT PUBLICATIONS

Capsule Report - 1975-76, 1976-77, 1977-78

School Predicted Scores - 1975-76
School Predicted Graphs - 1976-77, 1977-78

Guide to Predicted Graphs - 1976-77, 1977-78

An Analysis of the Results of the Florida Educational Assessment using the NAEP Model, Reading and Mathematics - 1974-75

A summary of Reading Results: NAEP, 1974-75

A summary of Mathematics Results: NAEP, 1974-75
"Everyone's Concern" - A brochure, summary of NAEP, 1974-75
State and District Report of Results, 1978-79

A Guide to 1977-78 Statewide Assessment Results: update 1978-79, 1979-80
Brochures;
Basic Skills Test Results 1976-77, 1977-78, 1978-79
"The Test" Brochures, 1977-78, 1978-79

The following publications are available from the Educational Products Distribution Section:

A Reference Source of Tests and Other Evaluation Instruments, #54

Catalog of State-Adopted Textbooks, 1979-80

Education Policy for the State of Florida, 1975

Florida is Going Metric, #23

Florida's Public Education Program, Winter 1976, #59

Focus on Public Education in Florida, February 1978. Annual Report of the Commissioner of Education, #64

Guidelines for Student Teaching in Florida, Spring 1977, #83

Oral Communication, 1974, #721

State Board of Education Regulations

Techniques for Teaching Remedial Cases, #53

The following publications are available only to educators requesting on letterhead:

Language Arts Instruction Based on Identification of Student Performance Needs, #132

Math Instruction Based on Identification of Student Performance Needs, #131

Reading Instruction Based on Identification of Student Performance Needs, #130

Florida Competency Based Teacher Education Modules

Cluster II:	Planning Skills for Teachers
Cluster III:	Presentation Skills for Teachers
Cluster IV:	Classroom Procedures
Cluster V:	Questioning Skills
Cluster VI:	Assessment

Other Florida Competency Based Teacher Education Modules

Generic Teaching Competencies

Florida Catalogs of Pupil Objectives

Comprehensive Health Education

Diagnostic-Prescriptive Reading System

-READING SUBTEST REFERENCES-

REFERENCES FOR READING SUBTEST

Aquino, M. R. The validity of the Miller-Coleman readability scale. Reading Research Quarterly, 1969, 4, 342-357.

Bell, D. The emperor's new cloze.. Journal of Reading, 1977, 20, 601-604.

Bolloni, L. F., and Jongsma, E. A. The effects of interest on reading comprehension of low-achieving students. Journal of Reading, 1978, 22, 106-109.

Betts, E. A. Foundations of Reading Instruction. New York: American Book Company, 1946.

Bormuth, J. R. Cloze as a measure of readability. International Reading Association Conference Proceedings, 1963, 8, 131-134.

Bormuth, J. R. Experimental application of cloze tests. International Reading Association Conference Proceedings, 1964, 9, 303-306.

Bormuth, J. R. Optimum sample size and cloze test length in readability measurement. Journal of Educational Measurement, 1965, 2, 111-116.

Bormuth, J. R. Validities of grammatical and semantic classifications of cloze test scores. International Reading Association Conference Proceedings, 1965, 10, 283-285.

Bormuth, J. R. Readability: a new approach. Reading Research Quarterly, 1966, 1, 79-132.

Bormuth, J. R. Comparable cloze and multiple-choice comprehension test scores. Journal of Reading, 1967, 10, 291-299.

Bormuth, J. R. Cloze test readability: Criterion reference scores. Journal of Educational Measurement, 1968, 5, 189-196.

Bormuth, J. R. Factor validity of cloze tests as measures of reading comprehension ability. Reading Research Quarterly, 1969, 4, 358-365.

Bormuth, J. R. On the theory of achievement test items. With an appendix by P. Menzell: On the linguistic bases of the theory of writing items. Chicago: University of Chicago Press, 1970

Bormuth, J. R. Development of standards of readability: toward a rational criterion of passage performance. Washington, D.C.: U.S. Office of Education, Project Report No. 9-0237, 1971. (ERIC Document Reproduction Service No. ED 054-233)

Bormuth, J. R. Reading literacy: its definition and assessment. In J. B. Carroll and J. S. Chall (Eds.), Toward a literate Society. New York: McGraw-Hill, 1975.

Carroll, J. B. Defining language comprehension: some speculations. In Carroll, J. R. and Freedle, R. O. Language comprehension and the acquisition of knowledge. Washington: D. C.: Winston, 1972.

Coleman, E. B. Improving comprehensibility by shortening sentences. Journal of Applied Psychology, 1962- 46, 131-134.

Cranney, A. G. The construction of two types of cloze reading tests for college students. Journal of Reading Behavior, 1972-1973, 5, 60-64.

Cronbach, L. J. Test validation. In R. L. Thorndike (Ed.), Educational Measurement (2nd ed.). Washington, D.C.: American Council on Education, 1971.

Davis, F. B. Fundamental factors in comprehension of reading. Psychometrika, 1944, 9, 185-197.

Davis, F. B. Research in comprehension in reading. Reading Research Quarterly, 1968, 3, 499-545.

Froese, V. Cloze readability versus the Dale-Chall formula. Atlantic City, New Jersey: Sixteenth Annual Meeting of the International Reading Association, 1971. (ERIC Document Reproduction Service No. ED 051 975)

Gates, A. I. The improvement of reading (3rd ed.). New York: The Macmillan Company, 1950.

Gray, W. S. On their own in reading. Chicago: Scott, Foresman and Company, 1948.

Guthrie, J. T., Seifert, M., Burnham, N. A., and Caplan, R. I. The maze technique to assess, monitor reading comprehension. The Reading Teacher, 1974, 28, 161-168.

Hansen, L. H., and Hesse, K. D. A pilot reading literacy assessment of Madison Public School Students: final report. Madison, Wisconsin: The Madison, Wisconsin Public Schools, The Department of Research and Development, 1974.

Hargis, C. H. A comparison of retarded and nonretarded children on the ability to use context in reading. American Journal of Mental Deficiency, 1972, 76, 726-728.

Harris, A. J. How to increase reading ability (3rd ed.). New York: Longmans, Green and Co., 1956.

Hills, J. R. and King, F J. Construct validity of the Florida Functional Literacy Test. Tallahassee, Florida: Florida Department of Education, 1978. (SDE No. 780-080)

Jefferson, G. L. Lexical and structural items as predictors of readability for high and low ability readers. Nineteenth Yearbook of the National Reading Conference, 1970, 172-178.

Katz, J., and Fodor, J. The structure of a semantic theory. In J. P. DeCecco (Ed.), The psychology of language, thought, and instruction: Readings. New York: Holt, Rinehart, and Winston, 1967.

King, F J. A content referenced interpretive system for standardized reading tests: Final report. (the Research Foundation of the National Council of Teachers of English) Tallahassee, Florida: Florida State University, 1974.

King, F J. Development of a reading comprehension test for college of education students. Unpublished report. Tallahassee, Florida: Florida State University, 1978.

Koslin, B. L., Koslin, S., and Zeno, Susan. Toward an effectiveness measure in reading. New York: the Board of Regents of the State of New York, 1978.

MacGinitie, W. H. Contextual constraint in English prose paragraphs. Journal of Psychology, 1961, 51, 121-130.

McKenna, M. Synonymic versus verbatim scoring of the cloze procedure. Journal of Reading, 1976, 20, 141-143.

Miller, G. R., and Coleman, E. B. A set of thirty-six prose passages calibrated for complexity. Journal of Verbal Learning and Verbal Behavior, 1967, 6, 851-854.

Miller, W. D., and French, S. Using the cloze procedure to determine the suitability of social science and science textbooks. Twenty-third Yearbook of the National Reading Conference, 1974, 254-258.

New York State. The Regents competency testing program, information brochure. Albany, New York: The State Education Department, 1978.

New York State. New York State preliminary competency test in reading, degrees of reading power, manual for administration and teachers. Albany, New York: The State Education Department, 1979.

Oller, J. W. Scoring methods and difficulty levels for cloze tests of proficiency in English as a second language. Modern Language Journal, 1972, 56, 151-157.

Oller, J. W., and Conrad, C. A. The cloze technique and ESL proficiency. Language Learning, 1971, 21, 183-195.

Olson, M. A. Evaluation of the passages selected for the Dallas Independent School District's content referenced reading scale. (Research Report No. 73-203) Dallas, Texas: Dallas Independent School District, 1973.

O'Reilly, R. P., Schuder, R. T., and Kidder, S. J. Validation of a multiple-choice cloze test of literal comprehension: summary report. Albany, New York: Bureau of School and Cultural Research, New York State Education Bureau, 1976.

Rankin, E. F. The cloze procedure--Its validity and utility. Eighth Yearbook of the National Reading Conference, 1959, 131-145.

Rankin, E. F., and Culhane, J. W. Comparable cloze and multiple choice comprehension test scores. Journal of Reading, 1969, 13, 193-198.

Riley, P. M. The cloze procedure--A selected annotated bibliography. Papua, New Guinea, University of Technology, 1975. (ERIC Document Reproduction Service No. ED 106 749)

Ruddell, R. A study of the cloze comprehension technique in relation to structurally controlled reading material. International Reading Association Conference Proceedings, 1964, 9, 298-302.

Schneyer, J. W. Use of the cloze procedure for improving reading comprehension. The Reading Teacher, 1965, 19, 174-179.

Schoelles, I. S. Cloze as a predictor of reading group placement. Atlantic City, New Jersey: International Reading Association, 1971. (ERIC Document Reproduction Service No. ED 053 868)

Taylor, W. L. Cloze procedure: A new tool for measuring readability. Journalism Quarterly, 1953, 30, 414-433.

Taylor, W. L. Recent developments in the use of cloze procedure. Journalism Quarterly, 1956, 33, 42-48.

Taylor, W. L. Cloze readability scores as indices of individual differences in comprehension and aptitude. Journal of Applied Psychology, 1957, 41, 19-26.

Taylor, W. L. Transcript of a discussion following F. P. Greene. Cloze symposium. Seventeenth Yearbook of the National Reading Conference, 1968, 110-131.

Taylor, W. L., and Waldman, I. N. Latency and focus methods of of cloze quantification. Nineteenth Yearbook of the National Reading Conference, 1970, 241-262.

B. WRITING SUBTEST

This Section Includes:

1. General Subtest Description
2. Criteria For Topic Selection
3. Guidelines For Scoring
4. Item Specifications
5. Examples Of Writing - Scored At Various Levels
6. References

-WRITING-

A. Each Examinee will write on one topic, to be selected from two options.

B. All topics will be required to meet these criteria:

1. Self-explanatory (i.e. clearly and explicitly phrased)
2. Defined and limited
3. Familiar to every examinee
4. Stimulating
5. Fresh
6. Of middle emotional ground (i.e. neither too pedestrian nor too sensational)
7. Non-biased and non-biasing

C. Scoring will be holistic (general impressionistic) on the following criteria:

1. Rhetorical Quality

1.1 Unity: An ordering and interdependence of parts producing a single effect; completeness.

1.2 Focus: Concentration on the chosen subject.

1.3 Clarity: Lucidity of expression; lack of ambiguity and distortion.

1.4 Sufficiency: Appropriate depth and breadth of expression to meet the writer's purposes and the demands of the particular topic.

2. Structural and Mechanical Quality

2.1 Organization: Consistent and coherent integration and connection of parts.

2.2 Development: Appropriate and sufficient exposition of ideas; use of detail, examples, illustrations, comparisons, etc.

2.3 Paragraph & Sentence Structure: Appropriate form, variety, logic, relatedness of and among structural units.

2.4 Syntax: Appropriate ordering of words to convey intended meaning.

3. Observance of Conventions in Writing

3.1 Usage: Appropriate use of language features: inflections, tense, agreement, pronouns, modifiers, vocabulary, level of discourse, etc.

3.2 Spelling, Capitalization, Punctuation: Consistent practice of accepted forms.

SUBTEST: Writing

COMPETENCY: 2

SUBSKILL: All

ITEM SPECIFICATIONS

STATEMENT

COMPETENCY: DEMONSTRATE THE ABILITY TO WRITE IN A LOGICAL EASILY UNDERSTOOD STYLE WITH APPROPRIATE GRAMMAR AND SENTENCE STRUCTURE.

SUBSKILLS:
a. Uses language at the level appropriate to the topic and reader.
b. Comprehends and applies basics mechanics of writing: spelling, capitalization, and punctuation.
c. Comprehends and applies appropriate sentence structure.
d. Comprehends and applies basic techniques for the organization of written material.
e. Comprehends and applies standard English usage in written communication.

GENERAL DESCRIPTION/RATIONALE

Given a choice of at least 2 topics the examinee will write an essay, letter or report which will demonstrate the competency and subskills specified. The writing sample will be scored holistically ("general impression marking") by at least three trained and experienced judges. The relationship of this assignment to the subskill is demonstrated in Figure 1.

FIGURE 1. How the Essential Competency Subskills in Writing are Evaluated by a Criterion Guided Holistic Rating Procedure.

	RHETORICAL				STRUCTURAL				CONVENTIONAL	
ESSENTIAL COMPETENCIES: Demonstrate the ability to write in a logical, easily understood style with appropriate grammar and sentence structure.	1.1 Unity	1.2 Focus	1.3 Clarity	1.4 Sufficiency	2.1 Organization	2.2 Development	2.3 Structure	2.4 Syntax	3.1 Usage	3.2 Mechanics
a. Use language appropriate to the topic and reader.			X	X						
b. Apply basic mechanics of writing.									X	X
c. Apply appropriate sentence structure.								X	X	X
d. Apply basic techniques for organization.	X	X			X	X	X			
e. Apply standard English usage.								X	X	X

STIMULUS ATTRIBUTES

1. The stimulus will be a choice of two topics and instructions to write on one of the topics.

2. The tone of the instruction should be friendly and supportive.

3. The instructions should specify the qualities on which the essay is to be judged, the qualities specified in the competency and subskill statements, NOT on the amount of the information displayed on the nature of the opinion expressed.

4. The instructions should encourage the examinees to plan and organize their thoughts before beginning to write.

5. The criteria for the selection of topics are:

   a. Self-explanatory (i.e. clearly and explicitly phrased)
   b. Defined and limited
   c. Familiar to every examinee
   d. Stimulating
   e. Fresh
   f. Of middle emotional ground (i.e. neither too pedestrian nor too sensational)
   g. Non-biased and non-biasing

RESPONSE ATTRIBUTES

1. Students will write their response on lined paper which will be provided, using (pens, pencils) provided.

2. Essays will be evaluated by teams of specially selected and trained judges, using these standards.

Scores will be on a 4-point scale, defined as follows:

Rating	Operational Definition
1	The essay lacks unity and focus. It is distorted and/or ambiguous, and it fails to treat the topic in sufficient depth and breadth. There is little or no discernible organization and only scant development of ideas, if any at all. The essay betrays only sporadically a sense of paragraph and sentence structure, and it is snytactically slipshod. Usage is irregular and often questionable and wrong. There are serious errors in spelling, capitalization, and punctuation.
2	The essay has some degree of unity and focus, but each could be improved. It is reasonably clear, though not invariably so, and it treats the topic with a marginal degree of sufficiency. The essay reflects some concern for organization and for some development of ideas, but neither is necessarily consistent nor fully realized. The essay reveals some sense, if not full command, of paragraph and sentence structure. It is snytactically bland and, at times, awkward. Usage is generally accurate, if not consistently so. There are some errors in spelling, capitalization, and punctuation that detract from the essay's effect if not from its sense.
3	The essay is focussed and unified, and it is clearly if not distinctively written. It gives the topic an adequate though not always thorough treatment. The essay is well organized, and much of the time it develops ideas appropriately and sufficiently. It shows a good grasp of paragraph and sentence structure, and its usage is generally accurate and sensible. Syntactically, it is clear and reliable. There may be a few errors in spelling, capitalization, and punctuation, but they are not serious.
4	The essay is unified, sharply focussed, and distinctively effective. It treats the topic clearly, completely, and in suitable depth and breadth. It is clearly and fully organized, and it develops ideas with consistent appropriateness and thoroughness. The essay reveals an unquestionably firm command of paragraph and sentence structure. Syntactically, it is smooth and often elegant. Usage is uniformly sensible, accurate, and sure. There are very few, if any, errors in spelling, capitalization, and punctuation.

Judges will be specially selected and trained. They will be required to reach a specified criterion of agreement with other judges (80%), and with their own repeated (blind) ratings (90%).

WRITING SAMPLES-SCORED AT DIFFERENT LEVELS

Rating = 1

TOPIC: Should sex education be taught in American public schools? Why or why not?

The subject of sex education in the public schools has been a highly heated arguement. There should be a sex education in public schools for the sense of education.

Many of the sexual problems of society today may be caused by not have a properly educate public in the subject of sex. These problems can be defined by that of illigiment children and by diseases. With sex education you can teach the children in ways of contraception and birth control. Also they can be taught in the detection of diseases such as V.D. and cancer.

The argument used by people against it is that it will make children more aware of sex and then procede to doing it at an early age. This is very wrong because children will see it and not think it is wrong and may not do as an espirement.

And if the children are all ready doing it then it may stop these unwanted babies and spung marriages. If they already are doing sexual actions they might as well be told about it. There are just a few reason for it.

In this paper I as the write am saying that sex education in the public schools should be taught. This is an very important subject and should be taught to the spung as well as the old. Sex is not something dirty but somethi done by all things in nature. Sex education is a subject worth learning about.

-An essay rated 1 by each of three experienced raters
An incompetent essay

Topic: Should sex education be taught in American public schools? Why or why not?

Commentary: This essay does little more than state, repeatedly, the writer's opinion that there should be sex education in the schools. The topic is given insufficient treatment; there is virtually no evidence cited to support the position and no development of any related idea(s). The writer uses paragraphs and sentences, but they are consistently ill-conceived. The paper is replete with discordant usage, and there are numerous misspellings.

Rating = 2.3

TOPIC: What are the essential characteristics of a good teacher?

Good teachers are essential in our schools. One essential characteristic is for the individual teachers to be interested in teaching children. A second characteristic is for the teacher to have some creative teaching abilities to help the students learn. A final characteristic is for the teacher to be understanding and care about his or her students. These three characteristics are just a few of the many things needed in being a good teacher.

Teachers should be interested in teaching because if they are not, the students should not be expected to be interested in learning. Teachers should like to teach children or they really have no business in the teaching profession. Teachers should want to help students learn what they will be needing throughout the rest of their lives.

Another essential characteristic for good teachers is that they should have some creative teaching abilities. Teachers need to spend much time on thinking how to make work interesting enough so children will want to learn. There are some kinds of work that is hard for teachers to make interesting, but for the most part, interesting work is essential. Also work can be fun and easy to learn if presented in the correct ways.

A final characteristic is for teachers to be understanding and care about the students. Students need praise from teachers as well as from parents and peers. This makes most students feel good about themselves and they will want to work harder for more praises. Teachers should also take time in helping individuals as much as possible with their learning questions or problems.

In summary, teachers play a very important part in the learning process of students. The teachers should want to teach, teach in an interesting way, and care about the students. Teachers need these three characteristics and many more in order to be successful in the teaching of children.

--An essay rated 2 by two experienced raters and 3 by a third experienced rater
An essay straddling the borderline between average and above-average competence

Topic: What are the essential characteristics of a good teacher?

Commentary: This essay treats the topic adequately though not in much depth. It is well organized: it is, in fact, a classic, school-taught, five-paragraph theme, with an introduction, a body, and a conclusion. Syntactically, it is flat and repetitious. Usage is pedestrian. The paper contains few, if any, errors in spelling, punctuation, and capitalization.

Rating = 3

TOPIC: Which person in public life do you most admire and why?

The person I admire most in public life is Billie Jean King because of her involvement and dedication to the women's sports movement. I am a Physical Education Major and can strongly relate to her opinions and ideas concerning women in sports.

She has been a major force in encouraging women to participate and feel good about being active. Starting with the women's professional tennis circuit, she has been a dominant personality to upgrade the prize money. In the early seventies, she and a few other women signed professional contracts for one dollar each. That was a beginning, ever since she has been on the move to increase prize money for women. Repetitious press conferences, exhibitions, endless promotions, and long hours filled her days for many years at the start of this movement. Because of her exceptional playing skill and endless promotion, people began to notice that women can do well in sports, and more important to the promoters, that it can be a profitable business. She created the beginning and other women followed her lead. Soon, there was a Women's Professional Tennis Circuit sponsored by Virginia Slims. This provided women with weekly competition against the best players, and at the same time provided them an attractive income.

Through the years television, magazines, golf suits, and other media have covered women's tennis. The bubble has burst; now girls start playing tennis at a early age in hope of becoming another Billie Jean King. Sometimes go out on the courts and dream of playing like BJK. She has opened the door for many females to go out and play tennis and feel good about doing it.

Since BJK is an international celebrity, anything she says or does is put in print. She has used her press coverage to support other sports for women. She has made a great deal of money and because of this advantage she has been able to start a magazine and also buy a Women's Professional Softball Team.

The magazine, Women Sports, was started in 1974 and she served

35

50

--An essay rated 3 by each of three experienced raters
An essay of above-average competence

Topic: Which person in public life do you most admire and why?

Commentary: This essay is well focussed and unified, and it is clearly though not distinctively written. It is well organized, develops ideas appropriately, and gives the topic sufficient treatment. Usage is generally accurate, and syntax is reliable. The essay shows a good grasp of sentence and paragraph structure. There are a few minor errors in punctuation.

51

Rating = 4

TOPIC: What values do you feel schools should attempt to impart to students?

Schools have long been repositories of social conscience. Regardless of their real impact on students — a subject zealously debated by all sorts of critics — schools are expected to be the chief purveyors of values deemed important by society. While I disagree with much of the conventional dogma of public education, which emphasizes a storybook assortment of virtues, I do feel that schools can and should contribute to the stock of values students acquire. Among the most significant of these are a sense of responsibility and independence, a respect for learning and intellectual achievement, and moral sensitivity.

Self-reliance and a personal code of responsibility are promoted in schools but more in word than in deed. I'd like to see schools give students greater freedom to do broader, deeper work and hold them accountable for it. Such an effort would in effect countermand the current craze (what better term to describe it?) for basic skills and minimum competencies, which has helped to foster ~~a mediocrity~~ a disdain for excellence and an avoidance of personal challenge. People do not learn to be independent and responsible through exhortations, but rather by practicing independence and responsibility in situations demanding them.

A greater insistence on personal responsibility and independence would bring with it, I think, a deeper respect for learning and intellectual achievement. Far too much academic work is motivated by external payoff — grades — leading inevitably to a marketplace view of intellectual ability ~~Exhibited~~ Exhibited by the frantic scramble of high school seniors for high SAT scores. What has happened to learning for its own sake, to intellectual endeavor spurred by nothing more than the distinctly human joy of using the mind purposefully? And

36

--An essay rated 4 by each of three experienced raters
An excellent essay

Topic: What values do you feel schools should attempt to impart to students?

Commentary: This essay is sharply focussed, unified, and distinctively effective. It treats the topic clearly, completely, and in suitable depth and breadth. The essay is very well organized and develops ideas appropriately. It has a firm command of paragraph and sentence structure, and it is syntactically smooth and, at times, elegant. Usage is uniformly sensible, accurate, and sure. There are no errors in spelling, capitalization, and punctuation.

References for Writing Subtest

REFERENCES FOR WRITING SUBTEST

Abrams, M. H. The Mirror and the Lamp. New York: W. W. Norton, 1953.

Anderson, S. B., et al., eds. Encyclopedia of Educational Evaluation. San Francisco: Jossey-Bass, 1975.

Association of English Teachers of Western Pennsylvania. Suggestions for Evaluating Senior High School Writing. Pittsburgh, PA: no date.

Bardy, J. An Investigation of the Written Examination. Philadelphia, PA: University of Pennsylvania Press, 1923.

Barrett, L. S., and Kroll, B. M. "Some Implications of Cognitive-Development Psychology for Research in Composing," pp. 49-58 in C. Cooper and L. Odell, eds., Research in Composing. Urbana, IL: NCTE, 1978.

Benveniste, E. Categories of Thought and Language. Coral Gables, FL: University of Miami Press, 1971.

Bernstein, B. "Social Class, Linguistic Codes, and Grammatical Elements," Language and Speech, 5, 1962, pp. 221-31.

Bernstein, R. S., and Tanner, B. R. "The California High School Proficiency Examination: Evaluating the Writing Sample." University of California at Berkeley, 1977. ERIC Document No. ED 147 806. Microfiche.

Bond, J. T., and Tamor, L. "Determining the Validity and Dependability of Writing Tests." Ypsilanti, MI: High/Scope Educational Research Foundation. Paper delivered at the 1979 meeting of the National Conference on Measurement in Education.

Braddock, R., Lloyd-Jones, R., and Schoer, L. Research in Written Composition. Champaign, IL: NCTE, 1963.

Braddock, R. "Evaluation of Writing Tests," pp. 118-26 in A. N. Grommon, ed., Review of Selected Published Tests in English. Urbana, IL: NCTE, 1976.

Breland, H. N. "A Study of College English Placement and the Test of Standard Written English." CEEB Research and Development Report RDH-76-77, No. 4. Princeton, NJ: Educational Testing Service, 1977.

Britton, J. L., Burgess, T., Martin, N., McLeod, A., and Rosen, H. The Development of Writing Abilities (11-18). London: Macmillan, 1975.

Britton, J. "The Composing Process and the Functions of Writing," pp. 13-28 in C. Cooper and L. Odell, eds., Research in Composing. Urbana, IL: NCTE, 1978.

Brossell, G., and Hoetker, J. "Handbook for the Writing Subtest of the Florida Teacher Competency Examination," 3 vols. Tallahassee, FL: Department of Teacher Education, State Department of Education, 1979.

California State Department of Education. "An Assessment of the Writing Performance of California High School Seniors, 1977." ERIC Document No. ED 189 036. Microfiche.

Commission on English. End-of-Year Examinations in English for College-Bound Students. Princeton, NJ: College Entrance Examination Board, 1963.

Commission on English. 12,000 Students and Their English Teachers. Princeton, NJ: 1968.

Chase, C. I. "The Impact of Some Obvious Variables on Essay Test Scores," Journal of Educational Measurement, 5, 1966, pp. 315-18.

Clark, M. Unpublished report on current research, delivered at the Canadian Council of Teachers of English Conference on Writing, Ottawa, Canada, May, 1979. Notes Only.

Coffman, W. "On the Reliability of Ratings of Essay Examinations," Research in the Teaching of English, 7, 1973, pp. 356-71. (Also pp. 80-92 in Mehrens (1976).)

Conlan, G. "ETS Programs for the Assessment of Writing. Some Considerations in Judging the Worth of an Essay Topic." Princeton, NJ: Educational Testing Service, February, 1979. Mimeographed handout.

Conlan, G. How the Essay in the CEEB English Test is Scored. Princeton, NJ: Educational Testing Service, 1976.

Cooper, C. R. "Holistic Evaluation of Writing," pp. 3-31 in C. Cooper and L. Odell, eds., Evaluating Writing. Urbana, IL: NCTE, 1977.

Cooper, C. R., and Odell, L., eds. Research on Composing. Urbana, IL: NCTE, 1978.

Cooper, C. R., and Odell, L., eds., Evaluating Writing. Urbana, IL: NCTE, 1977.

Cox, R. "Reliability and Validity of Examinations," in J. Lauwerys and D. Scanlon, eds., The World Yearbook of Education, 1969: Examinations. London: Evans Brothers, 1969.

Council on Teacher Education. "Minutes: January 15-17, 1979." Tallahassee, FL: Department of Teacher Education, 1979.

Davis, D., and Taft, R. "Measure of Preference for Speaking Rather Than Writing and Its Relationship to Expressive Language Skills in Adolescents," Language and Speech, 19, 1976, pp. 224-35.

Daly, J., and Shamo, W. G. "Writing Apprehension and Occupational Choice," Journal of Occupational Psychology, 49, 1976, pp. 55-6.

Dick, W., and Hagerty, N. Topics in Measurement. New York: McGraw-Hill, 1971.

Diederich, P. Measuring Growth in English. Urbana, IL: NCTE, 1974.

Diederich, P., French, J. W., and Carlton, S. Factors in Judgments of Writing Ability. Princeton, NJ: Educational Testing Service, 1961.

DuCette, J., and Wolk, S. "Test Performance and the Use of Optional Questions," pp. 104-11 in W. A. Mehrens, ed., Readings in Measurement and Evaluation in Education and Psychology. New York: Holt, Rinehart, and Winston, 1976.

Duke, C. R. "Basic Writing Skills Assessment Project: An Interpretive Report." Plymouth (NH) State College, 1974. ERIC Document No. ED 153 245. Microfiche.

Ebel, R. "The Characteristics and Uses of Essay Tests," pp. 84-123 in Measuring Educational Achievement. Englewood Cliffs, NJ: Prentice-Hall, 1965.

Educational Research Institute of British Columbia. "English Placement Test (EPT): Project Technical Report for May Test, 1977." Vancouver, B. C.: September, 1977. ERIC Document No. ED 152 817. Microfiche.

Educational Testing Service. The College Board Admission Testing Program: A Technical Report on Research and Development Activities.... New York: College Entrance Examination Board and Educational Testing Service, 1971.

Educational Testing Service. State Educational Assessment Programs. Princeton, NJ: Educational Testing Service, 1971.

Educational Testing Service. Index to Educational Testing Service Research Reports. Princeton, NJ: Educational Testing Service, various dates.

Educational Testing Service. Locating Information on Educational Measurement. New York: Educational Testing Service, 1969.

Elbow, P. Writing Without Teachers. New York: Oxford University Press, 1971.

Emig, J. "Hand, Eye, Brain: Some 'Basics' in the Writing Process," pp. 59-72 in C. Cooper and L. Odell, eds., Research in Composing. Urbana, IL: NCTE, 1978.

Emig, J. The Composing Processes of Twelfth Graders. Champaign, IL: NCTE, 1971.

Erickson, R. C., and Wentling, T. L. Measuring Student Growth. Boston: Allyn and Bacon, 1976.

Foley, J. "Evaluation of Learning in Writing," pp. 767-813 in B. Bloom et al., eds., Handbook of Formative and Summative Evaluation of Student Learning. New York: McGraw-Hill, 1971.

Follman, J. C., and Anderson, J. A. "An Investigation of the Reliability of Five Procedures for Grading English Themes," Research in the Teaching of English, 1, 1967, pp. 190-200.

Fort Valley College (Georgia). "An Examination of the Effects of Time for Administration on Students' Performance on the Language Skills Examination of the Georgia Regents Testing Program, 1974." Abstract in Roberts and Rentz (1977).

Freedman, S. "The Evaluation of Student Writing." San Francisco State College, 1978. ERIC Document No. Ed 157 079. Microfiche.

Freedman, S. "Influences on the Evaluators of Student Writing." Unpublished doctoral dissertation, Stanford University, 1977.

Godschalk, F. I., Swineford, F., and Coffman, W. E. The Measurement of Writing Ability. New York: College Entrance Examination Board, 1966. See also the essay reviews of this study: Becker, S. L., Steinmann, M., and Godschalk, F. I., "Roundtable Review," Research in the Teaching of English, 1, 1967, pp. 76-86.

Grommon, A. H., et al., eds. Review of Selected Published Tests in English. Urbana, IL: NCTE, 1976.

Harris, D. P. "The Testing of Student Writing Ability," pp. 137-45 in G. Tate, ed., Reflections on High School English. Tulsa, OK: University of Tulsa Press, 1966.

Henderson, F. M. "An Analysis of Essay Evaluations Among Raters from Four Institutions in the University System of Georgia. Unpublished research project, Nova University (FL). Abstract in Roberts and Rentz (1977).

Hirsch, E. D. The Philosophy of Composition. Chicago: University of Chicago Press, 1977.

Hoffman, B. The Tyranny of Testing. New York: Crowell-Collier, 1962.

Hoffman, E. M., and Shifsky, J. "Designing Writing Assignments," English Journal, 66, 1977, pp. 41-5.

Hogan, C. "Let's Not Stop the Impromptu Test Essay Yet," Research in the Teaching of English, 11, 1977, pp. 219-25.

Hudson, B. Assessment Techniques. London: Methuen Educational, 1973.

Huntley, R. M., Schmeiser, C. B., and Stiggins, R. J. "The Assessment of Rhetorical Proficiency: The Role of Objective Tests and Writing Samples." American College Testing Program. Unpublished Paper delivered at the 1979 meeting of the National Conference on Measurement in Education.

Illinois Association of Teachers of English. "A Thousand Topics for Composition," Illinois English Bulletin, February, 1971, entire issue.

Janzen, H. L., and Hallworth, H. J. "Demographic and Biographic Predictors of Writing Ability," Journal of Experimental Education, 4, 1973, pp. 43-53.

Jerabek, R., and Dieterich, D. "Composition Evaluation: The State of the Art. An ERIC/RCS Report," College Composition and Communication, 26, 1975, pp. 183-6.

Kinneavy, J. L. A Theory of Discourse. Englewood Cliffs, NJ: Prentice-Hall, 1971.

Klein, S. P. and Hart, F. M. - "Chance and Systematic Factors Affecting Essay Grades," Journal of Educational Measurement, 5, 1968, pp. 197-206

Koch, C. and Brazil, J. M. - "Evaluating Essays," pp. 8-12 in C. Koch and J. M. Brazil, Strategies for Teaching the Composing Process. Urbana, IL: NCTE

Kravetz, N. - The Evaluation of Educational System Outputs: An Exploratory Study. Paris: International Institute for Educational Planning, 1970

Lloyd-Jones, R. - "The National Assessment of Educational Progress," SLATE Pamphlets, 2:6, October, 1977, pp. 1-3

Lloyd-Jones, R. - "Primary Trait Scoring," pp. 33-66 in C. Cooper and L. Odell, eds., Evaluating Writing, Urbana, IL: NCTE, 1977

Long, L., ed. - Writing Exercises from "Exercise Exchange." Urbana, IL: NCTE, 1976

Macintosh, H. G. - Techniques and Problems of Assessment. London: Edward Arnold, 1974. (Especially Chapters 1 and 2 on open-ended and structured essay questions.)

McClelland, D. - "Testing for Competency Rather Than Intelligence," American Psychologist, 28, 1973, pp. 1-14

McColly, W. - "What Does Educational Research Say About the Judging of Writing Ability?" Journal of Educational Research, 64, 1970, pp. 147-56

Marshall, J. C. - "Writing Neatness, Composition Errors, and Essay Grades Reexamined," Journal of Educational Research, 65, 1972, pp. 213-20

Marshall, J. C. and Powers, J. M. - "Writing, Neatness, Composition Errors, and Essay Grades," Journal of Educational Measurement, 6, 1969, pp. 97-101

Marshall, J. C. - "Composition Errors and Essay Examination Grades Reexamined," American Educational Research Journal, 4, 1967, pp. 375-85

Mehrens, W. A., ed. - Readings in Measurement and Evaluation in Education and Psychology. New York: Holt, Rinehart, & Winston, 1976

Mellon, J. C. National Assessment and the Teaching of English. Urbana, IL: NCTE, 1975.

Meyer, G. "The Choice of Questions on Essay Examinations," Journal of Educational Psychology, 30, 1939, pp. 161-71.

Moffett, J. Teaching the Universe of Discourse. Boston: Houghton-Mifflin, 1968.

Montgomery, R. J. Examinations: An Account of Their Evolution as Administrative Devices in England. Pittsburgh, PA: University of Pittsburgh Studies in Comparative Education, No. 6. (Especially pp. 232-241, "Examinations for Teachers.")

Mullis, I. V. S. "Highlights and Trends from National Assessment: Writing and Changes in Writing Trends." Education Commission of the States, 1977. ERIC Document No. ED 128 814. Microfiche.

Mullis, I. V. S. "The Primary Trait System for Scoring Writing Tasks." Education Commission of the States, 1976. ERIC Document No. ED 124 942. Microfiche.

Noyes, E. S. "Essay and Objective Tests in English," College Board Review, 49, 1963, pp. 7-10.

Odell, L., and Sage, S. "Written Products and the Writing Process." Paper delivered at the 1978 meeting of the American Educational Research Association. ERIC Document No. ED 157 059. Microfiche.

Odell, L., Cooper, C., and Courts, C. "Discourse Theory: Implications for Research," pp. 1-12 in C. Cooper and L. Odell, Research on Composing. Urbana, IL: NCTE, 1978.

Ondee, F. "An Analytic Study of the Essay Test of the Language Skills Examination in the Georgia Rising Junior Testing Program." Unpublished doctoral dissertation, University of Georgia, 1973. ERIC Document No. ED 092 949. Microfiche.

Pannwitt, B. "Putting It In Writing: Some Notes on the Teaching of Composition." Curriculum Report, No. 5, National Association of Secondary School Principals, 1976. ERIC Document No. Ed 124 946. Microfiche.

Payne, D. A. "Constructing and Scoring Essay Tests," pp. 79-91 in The Specification and Measurement of Learning Outcomes. Waltham, MA: Blaisdell Publishing, 1968.

Purves, A. "Evaluating Growth in English," pp. 230-259 in J. Squire, ed., The Teaching of English, The 76th Yearbook of the National Society for the Study of Education, Part I. Chicago: University of Chicago Press, 1977.

Purves, A. Common Sense and Testing in English. Urban, IL: NCTE, 1975.

Regents Testing Program (Georgia). "An Examination of Student Performance on the Language Skills Examination Under Different Conditions of Time and Choice of Topic." Unpublished research study, 1974. Abstract in Roberts and Rentz (1977).

Rentz, R. R. "The Regents' Testing Program of the University System of Georgia." Unpublished document, Georgia State University, 1978.

Roberts, D. and Rentz, R. R. "Research Related to the Reliability and Validity of the Langage Skills Examination of the Regents' Testing Program. Unpublished document. Atlanta, GA: University System of Georgia, 1977.

Rosen, H. "An Investigation of the Effects of a Differentiated Writing Assignment on the Performance of a Selected Group of 15/16 Year Old Pupils." Unpublished doctoral dissertation, University of London, 1969.

Rosen, H. "Writing Prose," pp. 72-82 in B. Jackson, ed., English versus Examinations. London: Chatto and Windus, 1969.

Rushton, J., and Young G. "Elements of Elaboration in Working Class Writing," Educational Research, 16, 1974, pp. 181-8.

Sanders, S., and Littlefield, J. "Perhaps Essays Can Reflect Significant Improvement in Freshman Composition," Research in the Teaching of English, 9, 1975, pp. 145-53.

Scannell, D. P., and Marshall, J. C. "The Effects of Selected Composition Errors on the Grades Assigned to Essay Examinations," American Educational Research Journal, 3, 1966, pp. 125-30.

Schmidt, F. L., Berner, J. G., and Hunter, J. E. "Racial Differences in Validity of Employment Tests: Reality or Illusion?" Journal of Applied Psychology, 58, 1973, pp. 5-9.

Singleton, D. J. "The Reliability of Ratings on the Essay Portion of the Language Skills Examination." Unpublished doctoral dissertation, University of Georgia, 1976. University Microfilms, 77-12, 416, 152. Abstract in Roberts and Rentz (1977).

Smith, R. F. "Grading the Advanced Placement English Examination, 1974." Princeton, NJ: Educational Testing Service, 1975.

Stalnaker, J. M. "The Essay Type of Examination," pp. 495-530 in E. F. Lundquist, ed., Educational Measurement. Washington, DC: American Council on Education, 1951.

Steele, J. M. "The Assessment of Writing Proficiency via Qualitative Ratings of Writing Samples." American College Testing Program. Unpublished paper delivered at the 1979 meeting of the National Conference on Measurement in Education.

Swanson, C. "Linguistics and the Crisis in Writing." Unpublished paper delivered at the 1975 meeting of the Linguistics Association. ERIC Document No. ED 126 520. Microfiche.

Thomas, L. L. "The Evaluation of Large Scale Writing Assessment Programs." The California State University and Colleges, 1979. Unpublished paper delivered at the 1979 meeting of the National Conference on Measurement in Education.

Thorndike, R. L., and Hagen, E. Measurement and Evaluation in Psychology and Education. New York: John Wiley and Sons, 1969. (Especially the chapter on "Improving Essay Tests," pp. 76-87.)

Tyler, R. W., and Wolf, R. M. Crucial Issues in Testing. Berkeley, CA: McCutcheon, 1974.

Weaver, P. "The Composing Processes of English Teacher Candidates." Unpublished doctoral dissertation, University of Illinois, 1973.

White, E. M. "Comparison and Contrast: The 1977 California State University and Colleges Freshman English Equivalency Examination." Long Beach, CA: English Council of the California State University and Colleges, 1977. Same title and source, 1974: ERIC Document No. Ed 114 826. Microfiche. Same title and source, 1973: ERIC Document No. Ed 114 825. Microfiche.

Whitfield v. Illinois Board of Law Examiners. 504 F.2nd 474 (1974).

Wilson, G. E., ed. Composition Situations. Champaign, IL: NCTE, 1966.

C. MATHEMATICS SUBTEST

This Section Includes:

1. Progress Development of the Specifications for the Mathematics Subtest
2. Guidelines for the Mathematics Subtest
3. Item Specifications

-Development of the Specifications for the Mathematics Subtest-

The Mathematics subtest was developed through an iterative process which involved, in addition to the project staff, faculty members from twelve colleges and universities, eight public and four private.

The composite review panel included representatives from a variety of areas of specializations including mathematics, test and measurements, elementary early childhood, science, music, and social studies. (A list of the members of the review team is provided in Specifications Bulletin I.)

ISSUES

One of the first project tasks was the generation of a list of issues which would provide guidelines for the development of the total set of item specifications. This task was completed in three phases: Initial Development; First Review; and Second Review.

Initial Development

The project staff generated a list of fourteen issues which should be considered in the development of the item specifications. These issues were derived from previous research activities conducted by members of the project staff and from Popham's suggestions for writing item specifications.

First Review

The list of fourteen issues was sent to the reviewers. Each reviewer was asked to indicate his/her agreement or disagreement on each issue, to clarify his/her response on each issue by making appropriate comments, and to suggest other issues.

Second Review

The project staff analyzed the data obtained from the first review of the issues and used this data base to formulate tentative recommendations of specifications which would serve as guidelines for developing the mathematics subtest of the Teacher Certification Examination.

ITEM SPECIFICATIONS

The second task was the development of item specifications for the Mathematics Subtest, which was accomplished in six stages: Development of prototype items for the five mathematics subskills; Review of the prototype items; Analyses of the reviewer's evaluations; Writing the item specifications; Review of the item specifications; and Revision of the specifications.

Prototype Items

The project staff developed an initial set of forty-six test questions representing the types of problems which could be used to assess the basic mathematics skills of the target population. Each test item was related to one of the following mathematics subskills:

a. Adds, subtracts, multiplies and divides whole numbers, decimals, and fractions.

b. Demonstrates the meaning and use of fractions and percents.

c. Represents and interprets data using charts, tables, graphs, and maps.

d. Solves measurement problems involving length, area, volume, capacity, weight, time and temperature, using U.S. customary and metric units.

e. Applies mathematical skills to solve real world problems.

Review of Prototype Items

The prototype items were distributed to the reviewers along with the list of fourteen issues. The reviewers were asked to evaluate each question according to whether or not a question of that type should be included in the competency test.

Analysis of Prototype Item Data

An analysis of the data pertaining to the prototype items and to the fourteen issues provided the project staff with a basis for constructing a list of fifty specifications for problems which appeared to be appropriate for the assessment program. The fifty specifications were distributed among the five subskills as follows:

a. Compute with whole numbers, decimals and fractions -- 24 specifications.

b. Meaning and use of fractions and percents -- 6 specifications.

c. Graphs, tables and maps -- 2 specifications.

d. Measurement -- 6 specifications.

e. Problem-solving -- 12 specifications.

Writing of Specifications

Each item specification was written by a member of the project staff. The stimulus and response attributes of each specification were selected to insure that test questions generated from the specification would be consistent with one of the subskills and to define a level of difficulty appropriate for the target population. In order to insure that every questions generated from a given specification would

not be essentially the same problem, the attributes were described in a manner so that the test writers would have some flexibility in constructing test questions.

The first draft of each specification was reviewed by a staff member, the specification was revised, and then reviewed by two members of the project staff. This internal review process was focused on the following criteria: (a) The attributes should be clearly stated; (b) The sample problem should be consistent with the attributes; (c) The attributes should be consistent with the data obtained from the review process.

Review of Specifications

After each one-fourth of the item specifications were written, they were submitted to six-eight reviewers. The reviewers were asked to evaluate the specifications with respect to the following criteria: (a) The attributes should be clearly stated; (b) The attributes should define a class of problems consistent with the identified subskill; (c) The difficulty level should be appropriate for the target population. Each reviewer returned the specifications sent to them. The consensus of the reviewers' evaluations for forty-seven of the fifty specifications was that the attributes described problems appropriate for the Teacher Certification Examination. In two cases two reviewers indicated that the problems generated by the specifications would be too difficult. These specifications were revised and submitted to another review team. In both cases, the second review team gave their approval of the specifications.

The item specifications were also reviewed and accepted by Department of Education personnel and by a COTE task force.

Revision of Specifications

Suggestions and comments offered by the various reviewers were generally incorporated into the revision of the specifications. Suggestions that would have significantly changed the nature of the problems generate by a specification or would have increased the difficulty of the questions are not reflected in the revised specifications, since such changes were the opinions of a single reviewer and not those of a majority of the persons reviewing the same set of specifications. The specifications presented to the reviewers were revised by the project staff to insure consistency in the format of presenting the attributes among the various specifications.

PRODUCTS

Overall Guidelines

Based on the data obtained from the review process, the project staff formulated a set of recommendations pertaining to the overall design of the mathematics

subtest of the Teacher Certification Examination.

Item Specifications

A total of fifty item specifications were developed by the project staff and were revised in accord with suggestions provided by the various reviewers.

-Guidelines for the Mathematics Subtest-

a. The Mathematics subtest will consist of 40 multiple-choice items, divided approximately as follows:

Subskills	50% Computation/ Understanding	50% Real World/ Problem Solving	No.	%
(1) Adds, subtracts, multiplies and divides whole numbers, decimals, and fractions.	15	4	19	48%
(2) Demonstrates the meaning and use of fractions and per cents.	3	3	6	14%
(3) Represents and interprets data using charts, tables, graphs, and maps.	1	2	3	8%
(4) Solves measurement problems involving length, area, volume, capacity, weight, time and temperature, using U.S. customary and metric units.	1	5	6	14%
(5) Applies mathematical skills to solve real world problems.		6	6	16%
	20	20	40	100%

b. Additional Specifications:

REAL WORLD

50% items teacher related and 50% items consumer related/problem solving
33% items can be answered by making a "ball-park" estimate
16% items will contain extraneous information
30% items will have information presented in a graph, table or drawing
50% items will involve two or more steps
16% items will be analysis or synthesis tasks

MEASUREMENT ITEMS

50% English and 50% metric
at least 12 items for each of the following topics: length, weight, capacity, area/perimeter/volume, elasped time

GENERAL

36% items will have "none of the above" as an option as indicated in the item specifications
12% items will have "none of the above" as the correct answer (6 Real World, 6 Computation/fact/understanding)

ITEM SPECIFICATIONS

for

MATHEMATICS SUBTEST

Code	MBa-1
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to add whole numbers.
Item Descriptor	Whole number addition: computation.

Stimulus Attributes

1. There should be three addends: one 2-digit, one 3-digit and one 4-digit.
2. The problem should be written in sentence form; the word "sum" should be used.
3. The addends should not be ordered according to the number of digits (not 2, 3, 4 or 4, 3, 2).
4. The problem should require at least two regrouping steps; one of these should be from hundreds to thousands.
5. In selecting the three addends, no digit should be used more than two times.

Response Attributes

1. Format:
   a. Numerical responses should be right justified and arranged in either ascending or descending order.
   b. Commas should be used in all numerical choices exceeding three digits.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should reflect a failure to regroup in at least one step.
   c. One foil should reflect an alignment error.
   d. One foil should reflect a single fact error: one digit in the sum should be one more or one less than the correct digit.
3. Another possible response:

   "None of the above" may replace either a or d. When used, this alterative should appear as the fourth choice.

Code	M5a-1a
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to add whole numbers.
Item Descriptor	Whole number addition: one-step application

Stimulus Attributes

1. The situation should be a common real-world situation presented in short paragraph form.
2. The solution should be the result of one-step addition.
3. There should be three to five addends, using 2 to 5 digit whole numbers-according to the situation. There should be at least one variation in the number of digits in the addends.
4. At least two addition regrouping steps should be necessary.
5. When choosing the addends, no digit should be used more than twice.
6. Extraneous information should appear in this problem.
7. The data may be presented in a table, chart or drawing. Data to be added should not be presented in a vertical column. A specific instruction such as "See the chart" should appear in the problem statement.

Response Attributes

1. Format:
   a. All numerical choices should be right justified and arranged in either ascending or descending order.
   b. Denominate numbers should be used when appropriate.
2. Four alternative responses:
   a. The correct response.
   b. One foil should reflect the result of using all or part of the extraneous information in addition to or in place of the needed data.
   c. One foil should reflect a computational error-a fact error, an alignment error, or a regrouping error.
   d. One foil should reflect a misinterpretation of the problem; for example, finding the average of the addends.
3. Another possible response:

   "None of the above" may replace either a, c or d as the fourth choice.

Code	M5a-2
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to subtract whole numbers.
Item Descriptor	Whole number subtraction: computation.

Stimulus Attributes

1. The problem should require the subtraction of a 4-digit whole number from a larger 4 or 5-digit number.
2. The problem may be written either horizontally or in sentence form.
3. At least two regrouping steps should be required.
4. Zero should appear in the tens and/or the hundreds place of the minuend.
5. In selecting the numbers, no digit should be used than twice.

Response Attributes

1. Format:
   a. Numerical choices should be right justified and arranged in either ascending or descending order.
   b. Commas should be used in all numbers exceeding three digits.
2. Four alternative responses:
   a. The correct answer.
   b. The result of subtracting the smaller number from the larger in each column.
   c. The result of failing to "record" regrouping steps.
   d. The result of one fact error--one of the digits in the foil answer should be either 1 or 2 removed from the correct digit.
3. Other possible responses:
   a. "None of the above" may replace either a or d. When used, this response should appear as the fourth choice.
   b. The result of adding the two numbers may replace either b, c, or d.

Code M5a-2a

Skill Basic Mathematics

Sub-skill Demonstrates and ability to subtract whole numbers.

Item Descriptor Whole number subtraction: one-step application.

Stimulus Attributes

1. The problem should present a real-world situation which can be solved by a one-step subtraction process.
2. The two numbers involved in the subtraction should each contain from 3 to 6 digits.
3. At least one regrouping step should be required in the subtraction process.
4. The answer should be a positive quantity.
5. The problem should contain extraneous information.
6. The data may be presented in a chart or graph; if so, specific instructions, such as "See the chart" should be given.

Response Attributes

1. Format:
   a. All numerical choices should be right justified and arranged in either ascending or descending order.
   b. Commas should be used in all numbers exceeding three digits.
   c. Denominate numbers should be used when applicable.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should be the result of using the wrong operation.
   c. One foil should be the result of a misinterpretation of the problem which leads to the use of the wrong data.
   d. One foil should be the result of an error in the subtraction process-a failure to regroup, a fact error, etc.
3. Another possible responses:

   Except when data is presented in a graph, "None of the above" may replace either a,b,c,or d.

Code	M5a-3
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to multiply whole numbers.
Item Descriptor	Whole number multiplication: computation.

Stimulus Attributes

1. The problem should require the multiplication of two whole numbers.
2. The problem should be written vertically; instructions may be either "Multiply" or "Find the product." The multiplication sign should appear in the problem.
3. The problem should involve at least two regrouping steps during the multiplication process.
4. The multiplier should be a 3-digit whole number; zero should appear in the tens' place.
5. The multiplicand should be either a 3-digit whole number or a 4-digit whole number containing a zero.
6. In selecting the factors, no digit may be used more than twice.
7. The digit appearing in units' place in each of the factors should be greater than 5.

Response Attributes

1. Format:
   a. Commas should be used in all numerical choices exceeding 4 digits.
   b. Numerical choices should be right justified and arranged in either ascending or descending order.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should reflect a regrouping error. This may be (1) a failure to carry or (2) a procedural error such as using the wrong "carried" number or adding the "carried" number before multipluing (e.g.,1,257,402).
   c. One foil should reflect an alignment error, a failure to move over 2 places for the second partial product (e.g.,151,182).
   d. One foil should reflect a fact error made when multiplying the units' digits (e.g.,1,254,404).
3. Another possible response:

   "None of the above" may replace either a,b,c or d. When used, this alternative should appear as the fourth choice.

Code	M5a-3a
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to multiply whole numbers.
Item descriptor	Whole number multiplication: one-step application

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation which requires a one-step multiplication process to obtain the answer.
2. The multiplicand should be a 3-digit whole number with at least two non-zero digits.
3. The multiplier should be a 2-digit whole number with only non -zero digits.
4. The multiplication process should involve at least two regrouping steps.
5. In choosing the factors no digit may be used more than twice.
6. Extraneous information may be included in this problem.
7. All or part of the data may appear in a table or chart. If so, a specific instruction such as "refer to the chart" should appear in the problem.

Response Attributes

1. Format:
   a. Numerical choices should be right justified and arranged in either ascending or descending order.
   b. Commas should be used in numerical choices exceeding three digits.
   c. Denominate numbers should be used when appropriate.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should reflect the result of using the wrong operation (e.g., 25 + 144=169).
   c. One foil should reflect a multiplication error, either in alignment or regrouping.
   d. If extraneous information is included in the problem, one foil should reflect the use of either all or part of that information. If the problem does not include extraneous information, the foil should reflect a fact error in units' place.
3. Another possible foil:

   "None of the above" may appear as the fourth choice, replacing a, b, c or d.

Code	M5a -4
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to divide whole numbers.
Item Descriptor	Whole number division: computation

Stimulus Attributes

1. The problem should require the division of a whole number by another whole number.
2. The problem should be written in sentence form.
3. The dividend should be a 4-digit whole number which is not a multiple of 10 or 100.
4. The divisor should be a 2-digit whole number which is not a multiple of 10.
5. The numbers should be chosen so that the quotient will be a 3-digit number which 0 in either the tens' or units' place.
6. In selecting the dividend and divisor, no digit may be used more than two times.

Response Attributes

1. Format:
   a. Numerical choices should be right justified and arranged in ascending or descending order.
   b. The remainder should be expressed as a whole number and indicated by Remainder.
2. Four alternative responses:
   a. The correct response.
   b. The result of omitting the zero in the quotient. The remainder should be correct.
   c. One foil should reflect the correct quotient but with an error in the remainder as follows: If the correct remainder is 0, the foil remainder should be the last partial quotient. If the correct remainder is not zero, then the foil remainder should be zero.
   d. One foil should reflect a failure to subtract-resulting in an incorrect partial quotient
3. Another possible response:

   "None of the above" may replace either a, c, or d. This choice should appear in the fourth position.

Code	M5a-4a
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to divide whole numbers.
Item Descriptor	Whole number division: one-step application.

Stimulus Attributes

1. The problem should present a real-world situation which requires a one-step division process for solution.
2. The divisor should be a 2-digit whole number.
3. The dividend should be a 4 or 5-digit whole number.
4. In selecting the dividend and divisor no digit, except zero, should be used more than twice. Zero may be used three times.
5. The dividend and divisor should be selected so that the quotient has at most 3 non-zero digits and so that the remainder is zero.
6. Extraneous information may be included in this problem.
7. All or part of the data may appear in a chart or graph.

Response Attributes

1. Format:
   a. All numerical choices should be right justified and arranged in either ascending or descending order.
   b. Commas should be used in numerical choices exceeding three digits.
   c. Denominate numbers should be used when appropriate.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should reflect the result of of using the wrong operation.
   c. One foil should reflect the result of a mistake in the division process.
   d. If extraneous information is included in the item, one foil should reflect the use of all or part of such information. If there is no extraneous information, the foil should reflect a fact error- in either division or subtraction.
3. Another possible foil:

"None of the above" may appear as the fourth choice replacing either a,b,c or d.

Code	MSa - 5
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to add decimals.
Item Descriptor	Decimal addition: computation.

Stimulus Attributes

1. There should be 3 addends consisting of: a 3-digit mixed number with one decimal place, a decimal fraction with two decimal places, and a 4-digit mixed number with three decimal places.

2. The problem should be presented in horizontal form. Instructions may vary: "Find the sum" or "Add".

3. The order of the addends should not be according to the number of decimal places.

4. The addition should require at least two regrouping steps; one of the regroupings should be across the decimal point, i.e. from tenths to ones.

5. In choosing the numbers, no digit may be used more than twice.

Response Attributes

1. Format:

   Numerical choices should be aligned according to the decimal point and arranged in either ascending or descending order.

2. Four alternative responses:

   a. The correct answer.

   b. The sum obtained by treating the numbers as though they were whole numbers, aligning on the right, adding and pointing off three decimal places.

   c. One foil should reflect a failure to "carry" during at least one of the regrouping steps.

   d. The result obtained by adding whole numbers and decimal components independently and omitting the fourth (left) digit in the decimal component of the sum.

3. Another possible response:

   "None of the above" may replace a, b, c or d. This alternative should appear as the fourth choice.

Code	M5a - 5a
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to add decimals.
Item Descriptor	Decimal addition: one-step application

Stimulus Attributes

1. The problem should present a real-world situation which requires the addition of decimals.
2. There should be either 3 or 4 addends. No more than 2 of these should have the same number of decimal places. At least one of the addends should be a mixed decimal number.
3. The addition process should require at least two regrouping steps - one of these should be across the decimal point.
4. The numbers chosen should each have no more than 5 digits.
5. When choosing the addends, no digit should be used more than twice.
6. This problem may contain extraneous information.
7. All or part of the data may appear in a graph or table. If so, specific instructions should be given referring the applicant to the data source.
8. If a chart or graph is used, decimals should be explicitly stated. However, the data should not appear in an aligned fashion, as all in one column aligned by decimal points.

Response Attributes

1. Format:
   a. The choices should be aligned according to the decimal point and arranged in either ascending or descending order.
   b. Denominate numbers should be used when appropriate.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should reflect the result of aligning the addends on the right rather than by the decimal point and then pointing off a number of decimal places equal to the number of places in the addend with the greatest number of decimal places.
   c. One foil should reflect the result obtained by adding whole number and decimal components independently and omitting the quantity which should have been "carried". (e.g., $1.36 million).
   d. If the problem contains extraneous information, one foil should reflect the use of either all or part of such information.

      If not, this foil should reflect either the use of only part of the needed data or the result of a computation error other than that described in c above.
3. Another possible response:

   "None of the above" may appear as the fourth choice to replace any of the alternatives.

Code	M5a - 6
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to subtract decimals.
Item Descriptor	Decimal subtraction: computation.

Stimulus Attriubtes

1. The problem should require the subtraction of one mixed decimal number from another mixed decimal number of greater numerical value.
2. The problem should be written in sentence form.
3. The minuend should be a 3-digit mixed decimal number with one decimal place.
4. The subtrahend should be a 4-digit mixed decimal number with two decimal places.
5. At least two regrouping steps should be required, including one from tenths to hundredths.
6. In selecting the stimulus numbers, no digit should be used more than twice.

Response Attributes

1. Format:
   a. All numerical choices should appear as mixed decimals.
   b. Numerical choices should be aligned according to the decimal point and arranged in either ascending or descending order.
2. Four alternative choices:
   a. The correct answer.
   b. One foil should reflect a failure to regroup from tenths to hundredths. Instead the hundredths' digit is "brought down".
   c. One foil should reflect the result of treating the quantities as whole numbers, that is subtracting the 3-digit number from the 4-digit number and marking off two decimal places.
   d. One foil should reflect the result of aligning the problem correctly but taking the smaller digit from the larger in each column.
3. Other possible responses:
   a. "None of the above" may replace either a or d. This alternative should appear as the fourth choice.
   b. To replace either b, c, or d, the result of bringing down the hundredths' digit of the subtrahend and completing the rest of the subtraction correctly except for a failure to compensate for one of the regrouping steps

Code MSa - 6a

Skill Basic Mathematics

Sub-skill Demonstrates an ability to subtract decimals.

Item Descriptor Decimal subtraction: one-step application.

Stimulus Attributes

1. The problem should present a real-world situation involving money which requires for its solution a one-step subtraction of decimals.
2. The minuend should be a whole number less than $100 and greater than $10. It should be written as a whole number, not as a decimal (e.g., $32 not $32.00).
3. The subtrahend should be a dollar and cent amount less than the minuend. A digit other than 0 should appear in hundredths' place.
4. Sales tax should not be included or considered in this problem.
5. In selecting the stimulus numbers, no digit should be used more than twice.
6. Extraneous information may appear in this problem.
7. All or part of the data may appear in a chart, table or map. If so, the problem statement must explicitly direct the applicant to the data source.

Response Attributes

1. Format:
   a. All numerical choices should involve both dollars and cents and be expressed in standard form (e.g., $10.33).
   b. Alternatives should be right justified and arranged in either ascending or descending order.
2. Four alternative choices:
   a. The correct answer.
   b. The result obtained by subtracting the whole number portion and bringing down the decimal fraction.
   c. If extraneous information appears in the problem, one foil should reflect the use of all or part of such information. If extraneous information is not included, then this foil should be the result obtained by not reducing the ones' digit in the minuend to reflect a regrouping from ones to tenths.
   d. One foil should be the sum of the stimulus numbers.
3. Another possible foil:

   "None of the above" may replace either a, c or d. If used, this alternative should appear as the fourth choice.

Code	M5a - 7
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to multiply decimals.
Item Descriptor	Decimal multiplication: computation.

Stimulus Attributes

1. The problem should require the multiplication of two decimal numbers, fractions and/or mixed.
2. The problem should be written in either sentence or horizontal form. If the horizontal form is used, instructions may read "Find the product" or "Multiply".
3. One of the factors should consist of 3 non-zero digits; the other should have three digits - exactly 2 of these should be non-zero digits greater than 5.
4. Each of the two factors should have at least one decimal place.
5. There should be no more than four decimal places in the product.
6. At least two regrouping steps should be necessary.
7. In choosing the factors, no digit should be used more than twice.

Response Attributes

1. Format:

   All numerical choices should be aligned according to the decimal point and arranged in either ascending or descending order.

2. Four alternative responses:

   a. The correct answer.

   b. One foil should reflect an error in regrouping during multiplication.

   c. One foil should reflect an alignment error during multiplication.

   d. One foil should reflect either (1) the omission of the decimal point or (2) an error in positioning the decimal point.

3. Another possible response:

   "None of the above" may replace either a, b or c. This choice should appear in the fourth position.

Code	M5a - 7a
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to multiply decimals.
Item Descriptor	Decimal multitplication: one-step application.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation requiring a one-step multiplication of decimals for its solution.
2. It should not be necessary to convert given information to decimals before multiplying. For example, tax and interest rates should not be expressed as percents.
3. At least one of the two factors required for the solution should have at least one decimal place.
4. The factors used should contain no more than 5 digits. The multiplier should have no more then two non-zero digits. The multiplicand should have no more than 3 non-zero digits.
5. There should be no more than four decimal places in the product.
6. At least one regrouping step should be necessary in the multiplication process.
7. When choosing the factors no digit, other than zero, should be used more than twice.
8. Extraneous information may appear in this problem.
9. All or part of the data may appear in a table or graph. If so, a specific instruction such as "See the chart" must be included in the problem statement.

Response Attributes

1. Format:
   a. Alternatives should be aligned according to the decimal point and arranged in either ascending or descending order.
   b. Denominate numbers should be used when applicable.
2. Four alternatives:
   a. The correct answer.
   b. One foil should be the result of choosing the wrong operation.
   c. One foil should reflect either (1) the omission of the decimal point or (2) an error in positioning the decimal point the number of places in the product should be the same as in the factor with the greater number of decimal places.
   d. If extraneous information appears in the problem, one foil should reflect the use of either all pr part of that information. If not, this foil should reflect a computational error somewhere in the multiplication process.
3. Another possible response:

"None of the above" may replace a, b or d. When used, this alternative should appear as the fourth choice.

Code M5a - 8

Skill Basic Mathematics

Sub-skill Demonstrates an ability to divide decimals.

Item Descrtiptor Decimal division: computation.

Stimulus Attributes

1. The problem should require the division of either a mixed decimal number or a whole number by a decimal fraction.
2. The problem may be written either horizontally or in sentence form. If the horizontal form is used, use ÷ not ⟌ to indicate division, instructions may read "Divide" or "Find the quotient".
3. The dividend should be either a 3-digit whole number or a 3-digit mixed decimal with one decimal place.
4. The divisor should be a 2 or 3-digit decimal with only one non-zero digit.
5. The quotient should have at most one decimal place and the remainder should be zero.
6. When choosing the numbers, no digit should be used more than twice.

Response Attributes

1. Format:
   a. There should not be a zero to the left of the decimal point if the decimal is less than one. (e.g., .05 not 0.05).
   b. Commas should be used when the whole number contains more than three digits.
   c. Alternatives should be aligned according to the decimal point and arranged in either ascending or descending order.
2. Four alternative choices:
   a. The correct answer.
   b. One foil should be the result of dividing by a whole number rather than a decimal
   c. One foil should be ten times greater than or one-tenth of the correct answer
   d. One foil should be the result of switching the places of the dividend and the divisor. The quotient should contain at most 3 non-zero digits.
3. Another possible response:

   "None of the above" may replace either a, b, ç or d as the fourth choice.

Code	MSa - 8a
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to divide decimals.
Item Descriptor	Decimal division: one-step application.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation which requires a one-step division process for its solution.
2. The divisor should be either a decimal fraction or a mixed decimal number. It should contain no more than three significant digits and no more than four decimal places.
3. The dividend may be a whole number, decimal fraction, or mixed decimal. It should consist of no more than five digits and contain no more than four significant digits.
4. The divisor and dividend should not have the same number of decimal places.
5. The divisor should not be a factor of 100. Neither should it be such that the problem could easily be solved by a multiplication process (e.g. If the notebooks were 50¢ each, then 2 could be bought for each dollar. So, 2 x 48 or 96 notebooks could be ordered.)
6. Except for zero, no digit should appear more than twice in the two numbers chosen for this problem.
7. A rounding step may be required; if so, explicit instructions must be given as to how many decimal places. Care should also be taken to avoid rounding an exact answer where the last non-zero digit is 5.
8. This problem may contain extraneous information.
9. A part or all of the data may appear in a chart, table, or graph. If so, instructions should direct the applicant to the data source.

Response Attributes

1. Format:
   a. Alternatives should be aligned according to the decimal point and arranged in either ascending or descending order.
   b. Commas should be used in whole number components exceeding three digits.
   c. Denominate numbers should be used when appropriate.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should be the result of using the wrong operation; this may also involve a rounding process (e.g., If subtraction is used, the answer 47.34 might be rounded to 47).
   c. One foil should be the result of misplacing the decimal point by one place - either to the right or the left.
   d. One foil should be the result of reversing the divisor and dividend; this result may reflect a misplacement of the decimal point.
3. Another possible foil:

   "None of the above" may replace either a, c or d. If used this should be the fourth alternative.

Code M5a - 9

Skill Basic Mathematics

Sub-skill Demonstrates an ability to add fractions.

Item Descriptor Fraction addition: computation.

Stimulus Attributes

1. The problem should require the addition of two mixed numbers.
2. The problem should be written vertically. Instructions should read "Find the sum" or "Add".
3. The addends should be two mixed numbers. One of these should be less than 10; the other should be greater than 10 but less than 100.
4. The fractional components of the mixed numbers should be proper fractions expressed in lowest terms. Their denominators should be two different numbers from this list: 2, 3, 4, 5, 6, 8, 9. The denominators should have no common factor other than 1.
5. The sum of the fraction components should be greater than 1.

Response Attributes

1. Format:
   a. All alternatives should be mixed numbers. Fractions should be reduced to lowest terms.
   b. Alternatives should be right justified and arranged in either ascending or descending order.
2. Four alternative choices:
   a. The correct answer.
   b. The result of adding the whole numbers correctly but adding the fractions by adding the numerators and denominators separately.
   c. The result of adding only the fraction components.
   d. The result of performing all the steps correctly except forgetting to add one to the whole number component after changing the improper fraction to a mixed number.
3. Other possible responses:
   a. "None of the above" may replace either a, b, c or d. If used, this choice should appear in the fourth position.
   b. The result of choosing the correct common denominator but using an incorrect procedure to obtain the numerators (e.g., $\frac{1}{3} = \frac{5}{12}$ and $\frac{3}{4} = \frac{6}{12}$ with an answer of $19\frac{11}{12}$). This may replace either c or d.

Code MSa - 9a

Skill Basic Mathematics

Sub-skill Demonstrates an ability to add fractions.

Item Descriptor Fraction addition: one-step application.

Stimulus Attributes

1. The problem should present in short paragraph form an everyday situation which requires a one-step addition of fractions for its solution.
2. There should be 2 or 3 addends- either fractions or mixed numbers. At least one of the addends should be a mixed number. The value of each addend should be less than 100.
3. The fractional components should be proper fractions expressed in lowest terms. Their denominators should be two or three different numbers from this list: 2, 3, 4, 5, 6, 8, 9, 10.
4. The sum of the fractions should be greater than 1.
5. This problem may contain extraneous information.
6. All or part of the data may be presented in a chart, table, graph, or drawing. However, the mixed numbers needed for the solution must be explicitly stated. No estimation should be required. Additionally, instructions such as "Refer to the graph" must be specifically made in the problem.

Response Attributes

1. Format:
   a. Alternatives should be fractions or mixed numbers. Fractions should be proper fractions.
   b. Alternatives should be right justified and arranged in either ascending or descending order.
   c. Denominate numbers should be used.
2. Four alternative responses:
   a. The correct answer - the fraction component should be reduced to lowest terms.
   b. One foil should be the result of adding the whole numbers correctly but adding the fractions by adding the numerators and denominators separately. This fraction may or may not be reduced to lowest terms
   c. One foil should be the result of a wrong operation
   d. If extraneous information appears in the problem, one foil should reflect the use of all or part of such information. Otherwise, this foil should reflect the result of performing all the steps correctly except forgetting to add to the whole number component after changing the improper fraction to a mixed number
3. Other possible responses:
   a. Response d may be replaced by the result of choosing the correct common denominator but using an incorrect procedure to obtain the numerators.

   b. "None of the above" may appear as the fourth choice replacing either a, c or d.

Code	M5a - 10
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to subtract fractions.
Item Descriptor	Fraction subtraction: computation.

Stimulus Attributes

1. The problem should require the subtraction of a mixed number from either a whole or mixed number.
2. The problem should be presented in vertical form. Instructions may be: "Subtract" or "Find the difference."
3. The minuend should be either a whole or a mixed number with a value between 10 and 100.
4. The subtrahend should be a mixed number which is less than the minuend.
5. The subtraction of the fraction should require a regrouping step.
6. The denominator(s) of the chosen fraction(s) should be from this list: 2, 3, 4, 5, 6, 8, 9, 10, 12. If two fractions are used, their denominators should be different numbers from this list.
7. All fractions used should be proper fractions expressed in lowest terms.

Response Attributes

1. Format:
   a. Alternatives should be either fractions or mixed numbers. All fractions should be proper fractions expressed in lowest terms.
   b. Alternatives should be right justified and ordered according to either ascending or descending value.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should be the result of a failure to regroup. If the minuend is a whole number, the fraction would be brought down If the minuend is a mixed number, the l.c.d. would be correctly chosen but the smaller quantity would be subtracted from the larger.
   c. One foil should be the result of a failure to record the regrouping step; the foil would be one greater than the correct answer
   d. One foil should be the sum of the quantities
3. Another possible response:

   "None of the above" may be substituted for either a, b, c or d.

Code M5a - 10a

Skill Basic Mathematics

Sub-skill Demonstrates an ability to subtract fractions

Item Descriptor Fraction subtraction: one-step application

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation requiring for its solution a one-step subtraction involving fractions.

2. The minuend should be either a whole or a mixed number. Its value should be between 10 and 100

3. The subtrahend should be a mixed number less than the minuend. This fraction component should be greater than the fraction in the minuend if one exists.

4. The denominators of the fractions chosen should be from this list: 2, 3, 4, 5, 6, 8, 9, 12. If two fractions are used, their denominators should have no common factor other than 1.

5. All fraction components should be proper fractions expressed in lowest terms.

6. Extraneous information may appear in this problem.

7. All or part of the data may appear in a chart, table, or drawing. If so, specific instructions such as "See the drawing" must be included in the problem.

Response Attributes

1. Format:

   a. Alternatives should be either fractions or mixed numbers. All fractions should be proper fractions expressed in lowest terms.

   b. Alternatives should be right justified and ordered according to either ascending or descending value.

   c. Denominate numbers should be used when appropriate.

2. Four alternative choices:

   a. The correct answer.

   b. One foil should be the result of a failure to regroup. When the minuend is a whole number, this would result in simply bringing down the subtrahend fraction. When the minuend is a mixed number, this would result in a correct l.c.d. but the smaller quantity would be subtracted from the larger

   c. One foil should be the result of adding the two quantities

   d. If extraneous information appears in the problem one foil should reflect the use of all or part of such data. If not, this foil should be the result of a failure to record the regrouping step-resulting in an answer 1 greater than the correct answer

3. Another possible response:

   "None of the above" may appear as the fourth choice replacing either a, c or d.

Code	M5a - 11
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to multiply fractions.
Item Descriptor	Fraction multiplication: computation.

Stimulus Attributes

1. The problem should require the multiplication of a fraction and a mixed number.
2. The problem should be stated in sentence form; use the word "product."
3. The fraction should have 1 as the numerator and either 2, 3, or 4 as the denominator.
4. The mixed number should be less than 10. Its whole number component should not be evenly divisable by the denominator chosen in 3 above. Its fractional component should have 1 as the numerator and a denominator of either 2, 3 or 4. However, the denominator should not be the same as that chosen in 3 above.
5. The numbers selected should necessitate a reducing or cancellation step (e.g., $\frac{1}{3} \times \frac{33}{4} = \frac{11}{4} = 2\frac{3}{4}$).

Response Attributes

1. Format:
   a. Each alternative should be expressed as either a proper fraction, a whole number or a mixed number. All fractions should be reduced to lowest terms.
   b. Alternatives should be right justified and arranged according to either ascending or descending order.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should reflect the result of multiplying one factor by the reciprocal of the other factor.
   c. One foil should be the whole number plus the product of the two fractions.
   d. One foil should reflect the result of adding the two numbers.
3. Other possible responses:
   a. "None of the above" may replace either a, b or d.
   b. One foil should reflect an error in changing a mixed number to an improper fraction, or vice versa. This foil may replace b, c or d.

Code M5a - 11a

Skill Basic Mathematics

Sub-skill Demonstrates an ability to multiply fractions.

Item Descriptor Fraction multiplication: one or two-step application.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation which requires the applicant to find a part of a part of a quantity.
2. Two proper fractions should be given.
3. The word names of the fractions should be used in the problem stem.
4. The denominators of the fractions chosen should be two different numbers from this list: 3, 4, 5, 6, 8. One of the fractions may be a unit fraction.
5. The correct answer may be a whole number, a mixed number or a fraction.
6. The correct answer should not require a rounding process.
7. Extraneous information may appear in the problem.

Response Attributes

1. Format:
   a. The choices should be right-justified and arranged in either ascending or descending order.
   b. Denominate numbers should be used when appropriate.
   c. Fractions appearing in the choices should be proper and reduced to lowest terms.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should reflect the result of finding the difference of the two fractions and then multiplying by the whole number.
   c. One foil should be the result of multiplying the whole number by one of the fractions.
   d. If extraneous information appears in the problem one foil should reflect the use of all or part of such information. If not, the foil should be the result of multiplying the whole number by the other fraction.
3. Another possible response:

   "None of the above" may appear as the fourth choice replacing either a, b, c or d.

Code MSa - 12

Skill Basic Mathematics

Sub-skill Demonstrates an ability to divide fractions.

Item Descriptor Fraction division: computation.

Stimulus Attributes

1. The problem should require the division of a fraction by another fraction.
2. The problem should be written in either horizontal or sentence form. If written in horizontal form, instructions should read "Divide" or "Find the quotient".
3. The divisor and dividend should be proper fractions expressed in lowest terms.
4. The denominators of the fractions should be two different numbers from this list: 3, 6, 7, 8, 9, 12.
5. Neither of the fractions should be a unit fraction.
6. The quotient should be either a fraction or a mixed number.

Response Attributes

1. Format:

   Alternatives should be right justified and arranged in either descending or ascending order.

2. Four alternative choices:

   a. The correct answer.

   b. One foil should be the result of mulitplying the two fractions.

   c. One foil should be the result of multiplying the divisor by the reciprocal of the dividend.

   d. One foil should be the result of finding the L.C.D. of the two fractions and the correct equivalent fractions but then making an error in the computation process.

3. Another possible response

   "None of the above" may replace either a or d.

Code NSa - 13

Skill Basic Mathematics

Sub-skill Demonstrates an ability to add, subtract, multiply, and divide whole numbers, decimals and fractions.

Item Descriptor Simplifying a mathematical expression using properties of operations

Stimulus Attributes

1. The statement should be symbolic and written horizontally. Instructions should direct the applicant to determine the value of the expression.
2. The problem should be constructed to reflect the application of at least two structural properties (e.g., distributive, associative, inverse).
3. The arithmetic should be simple if structural properties are used, but complicated otherwise (e.g., $3.47 + 1.53 = 5$ and $5 \times \frac{1}{5} = 1$).
4. The expression should require the use of at least one pair of parentheses.

Response Attributes

1. Format:

   Numerical answers should be aligned by units' place and arranged in either ascending or descending order.

2. Four alternative choices:
   a. The correct answer.
   b. One foil should reflect a procedural error involving the parentheses.
   c. One foil should reflect a procedural error involving order of operations.
   d. One foil should reflect a computational error; this may involve a failure to perform one of the steps.

Code M5b - 1

Skill Basic Mathematics

Sub-skill Demonstrates an understanding of the meaning of fractions.

Item Descriptor Fractions meaning: order.

Stimulus Attributes

1. The problem should ask the applicant to determine which of four fractions has the least or greatest value.
2. The data should be presented in the alternative choices.
3. Denominators of the fractions should be either less than twenty, or a multiple of ten less than or equal to one hundred, or a multiple (2, 3, 4, 5, or 10) of the denominator of the correct answer.

Response Attributes

1. Format:
   a. All alternatives should be proper fractions expressed in lowest terms.
   b. The alternatives should be right justified.
   c. The alternatives should not be arranged in either ascending or descending order.
2. Four alternative choices:
   a. The correct answer.
   b. One foil should be the fraction with the least or greatest value depending on the nature of the question. The correct answer and this foil should have the same numerator.
   c. One foil should have a numerator and a denomiator greater (less) than the numerator and the denominator of the correct answer; and either the numerator or the denominator should be a multiple of or a factor of the numerator or denominator in the correct answer.
   d. One foil should have the same denominator as the correct answer but have a greater (smaller) numerator.

Code	M5b - 1a
Skill	Basic Mathematics
Sub-skill	Demonstrates an understanding of the meaning of fractions.
Item Descriptor	Fractions meaning: model interpretation.

Stimulus Attributes

1. This problem should require the applicant to determine which of 4 partially-shaded figures represent the same fraction. The numeric name of the fraction should not be given.

2. Four figures (circles and/or polygons) should be used. Two similar figures may be used provided that there is an obvious difference in their areas and/or in the orientation of the shaded portions.

3. The figures should be divided into a number of equal parts. Some of these parts should be shaded. The ratio of the number of shaded parts to the total number of divisions will determine the fraction which the figure represents.

4. Selection of figures:

   a. One figure should be the "base" for construction of the other figures. This base figure should represent a proper fraction in lowest terms. Its denominator should be either 3, 4, or 5.

   b. One figure should have the same number of shaded parts as the base figure. The size of the shaded area in this figure should not equal the size of the shaded area in the base figure. This figure may or may not represent the same fraction as the base figure.

   c. One figure should have a number of shaded parts which is a multiple of the number of shaded parts in the base figure. This figure may or may not represent the same fraction.

   d. One figure should have a shaded area equal in size to that in the base figure. It should also have the same number of shaded parts as the base. This figure may or may not represent the same fraction.

5. The figures should be labeled Figure 1, Figure 2, etc. However they should not be numbered according to 4 a-d.

6. Care should be taken that there should be only one fraction which has equivalent representations.

Response Attributes

1. Format:
   a. Responses should be statements which explicitly state which figures represent the same fraction. Statements which refer to a portion of the figures should read: "Figures _____ represent the same fraction".

   b. Responses should be randomly ordered.

2. Four alternatives: one of these will be the correct answer.

   a. One choice should be an explicit statement naming the figures which have an equal number of shaded parts but which do not have shaded areas which are equal in size.

   b. One choice should name the base figure and the figure containing a number of shaded parts which is a multiple of the number of shaded parts in the base figure.

   c. One choice should explicitly name those figures having both an equal number of shaded parts and an equal shaded area.

   d. Each of these figures represents a different fraction.

3. There should be only one choice which is a true statement.

Code M5b - 2

Skill Basic Mathematics

Sub-skill Demonstrates an ability to use fractions.

Item Descriptor Fraction use: ratio, one-step.

Stimulus Attributes

1. The problem should present in a short paragraph a real-world situation involving ratio.
2. The ratio and one proportionate part should be given. The applicant should be asked to find the amount of the other part.
3. The ratio should consist of 2 whole numbers greater than 1 but less than 10. They should have no common factor other than 1.
4. The number representing the "part" should be a whole number having no more than 5 digits and no more than 3 significant digits.
5. It should not be necessary to perform a rounding process in order to calculate the right answer.
6. Extraneous information may be included in this problem.

Response Attributes

1. Format:
   a. All numerical choices should be right justified and arranged in either ascending or descending order.
   b. Denominate numbers should be used when appropriate.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should be the result of reversing the ratio.
   c. One foil should be the result of treating the "part" as a total.
   d. If extraneous information appears in the problem, one foil should reflect the use of all or part of such information. If not, this foil should be the result of treating the "part" as a whole and considering the wrong number from the 2 ratio numbers.
3. Another possible response:

   "None of the above" may appear as the fourth choice replacing either a, b, c or d.

Code M5b - 3

Skill Basic Mathematics

Sub-skill Demonstrates an understanding of the meaning of percents.

Item Descriptor Percent meaning: equivalence to fractions.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation which requires the applicant to change a proper fraction to its percent equivalent.
2. Both the numerator and the denominator of the fraction should appear in the problem written in their word names (e.g. four, not 4). The resulting fraction should be in lowest terms.
3. The following fractions should not be used: $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{1}{5}$, and $\frac{1}{10}$ or any multiple of $\frac{1}{10}$.
4. If a rounding process is required, the problem stem should state that the answer should be rounded to the nearest tenth of a percent.
5. Extraneous information may appear in this problem.

Response Attributes

1. Format:
   a. All numerical choices should use the percent sign. Fractional percents should be rounded to the nearest tenth of a percent.
   b. Choices should be either right justified or aligned according to the decimal point.
   c. Choices should be arranged in either ascending or descending order.
2. Four alternative choices:
   a. The correct answer.
   b. One foil should be the result of converting the fraction to a fraction other than hundredths or incorrectly converting from a decimal to a percent.
   c. One foil should reflect the result of reversing the numerator and the denominator.
   d. If extraneous information appears in the problem, one foil should reflect the use of all or part of such information. If not, the foil may be the result of changing a unit fraction with the correct denominator to a percent.
3. Other possible foils:
   a. Except in a situation where rounding is required, "None of the above" may be used as the fourth alternative to replace either a, c or d.
   b. Response d may be replaced by the result of using only the numerator of the fraction

Code M5b - 3a

Skill Basic Mathematics

Sub-skill Demonstrates an understanding of the meaning of percent.

Item Descriptor Percent meaning: model interpretation.

Stimulus Attributes

1. The problem should be a real-world situation in which the partitioning of a total quantity is depicted in a graph or a drawing.
2. The situation should be presented in short paragraph form and should require an approximate determination of what percent a part is of the whole.
3. The part should be comprised of at most three sections or all but one section.
4. The partitioning of the whole should be such that the percent can be determined by visual observation.
5. The correct answer should be restricted to one of the following percents: 25, 33, 67, 75 or a multiple of 10.
6. Data which would permit an arithmetical computation of the answer should not be provided. However, extraneous information may be included in the problem statement.
7. The problem question should state that only an approximate answer is required.
8. Included in the problem statement there should be an explicit instruction such as "See the graph".
9. The graph or figure should be labeled.

Response Attributes

1. Format:
   a. Alternatives should be written as whole number percents, using the symbol %.
   b. Alternatives should be right justified and arranged in either ascending or descending order.
2. Four alternative choices:
   a. The correct answer.
   b. One foil should be the number of sections which comprise the part.
   c. One foil should be the complement of the correct answer.
   d. One foil should require a discrimination with respect to one of the following: 0, 10, 25, 33, 50, 67, 75, 90, 100. The difference between this foil and the correct answer should be at least 5.
3. Another possible response:

   "None of the above" may replace either a, b, c or d as the fourth choice.

Code	M5b - 4
Skill	Basic Mathematics
Sub-skill	Demonstrates the ability to use percents.
Item Descriptor	Percentage: all three cases; one-step.

Stimulus Attibutes

1. The problem should present a real-world task which involves solving one of the three cases: find percent, percentage, or base.
2. The numbers chosen should be 2 or 3-digit whole numbers which have no common factor other than 1. The number representing the base should not be a factor of 100.
3. Neither the percent involved in the problem nor the computed rate should be less than 1% or greater than 1000%.
4. The problem should require that the answer be rounded to the nearest whole percent or whole number.
5. The last non-zero digit in the computed answer should not be 5.
6. Extraneous information may appear in this problem.

Response Attributes

1. Format:
   a. Denominate numbers should be used when appropriate.
   b. Numerical choices should be right justified and arranged in either ascending or descending order.
2. Four alternative choices:
   a. The correct answer.
   b. The result of a misinterpretation of the problem. For example, treating a whole number as a percent or a percent as a whole number (e.g., 75 x .56 = 42). This foil could reflect the omission or misplacement of the decimal point.
   c. The result of rounding incorrectly. For example, rounding the quotient expressed as a decimal to the nearest whole number rather than rounding the percent to the nearest whole number or rounding a whole number to the nearest ten or hundred instead of to the nearest unit.
   d. If extraneous information appears in the problem one foil may reflect the use of all or part of such information. Otherwise, the foil should be the result of a computation error. For example, interchanging the roles of the dividend and divisor in a division problem or performing the wrong operation.

Code MSc - 1

Skill Basic Mathematics

Sub-skill Demonstrates an ability to obtain data from a chart or graph.

Item Descriptor Table, graph, etc: obtain data.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation which requires the applicant to obtain data from a chart, table, or graph.
2. If a graph is used, it should be either a bar or a line graph.
3. Specific instructions in the problem stem should refer the applicant to the table, chart, or graph.
4. In order to maintain a reasonable level of complexity the range of the table or graph should be from a 4 x 5 grid to an 8 x 10 grid.
5. The table or graph must be clearly labeled, including the ordinate and abscissa.
6. The data sources should be based upon a scale. The scale must be clearly stated-either on the graph or in the label. It should be necessary to use the scale to obtain the correct answer.
7. The data obtained may require interpolation.
8. Extraneous information should be included in this problem.

Response Attributes

1. Format:
   a. Numerical choices should be either right justified or aligned according to the decimal point.
   b. Choices should be ordered according to either ascending or descending value except when the nature of the problem dictates that they should not be ordered.
   c. Denominative numbers should be used when applicable.
   d. Commas should be used in numbers having more than 4 digits.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should be the result of a misinterpretation of the problem.
   c. One foil should reflect an error in using the data source. The foil should be the result of moving one column and/or one row away from the correct solution.
   d. One foil should be the result of an incorrect use of the scale.

Code M5c - 1a

Skill Basic Mathematics

Sub-skill Demonstrates an ability to interpret data from a graph or table.

Item Descriptor Table, graph, etc: obtain data and solve one or two-step problem.

Stimulus Attributes

1. The problem should present a real-world situation with the data presented in either a graph or a table. The problem statement should be in short paragraph form.
2. The problem should require the determination of data from the graph or table and the utilization of the data.
3. The solution should not require the determination of more than 3 facts from the graph or table.
4. The solution of the problem should involve one or two computational steps, using the data obtained from the graph or table.
5. Included in the problem statement there should be an explicit instruction such as "See graph".
6. If a graph is used, it may be either a bar, circle, line or pictograph.
7. To maintain a reasonable level of complexity the range of the table or graph should be from a 4 x 5 grid to an 8 x 12 grid.
8. Data may be presented as whole numbers, decimals, or percents. Each fact should have not more than 3 significant digits.
9. The graph or table should be labeled.

Response Attributes

1. Format:
   a. The choices should be right justified and ordered by either ascending or descending value.
   b. The numerical answers should be appropriate to the situation presented; denominate numbers should be used when applicable.
   c. The number of significant digits should be consistent with the problem situation.
2. Four alternative choices:
   a. The correct answer.
   b. One foil should be the result of obtaining the wrong data.
   c. One foil should result from either using the wrong operation or incorrectly performing the correct operation or failing to complete both steps of a two-step problem.
   d. One foil should be the result of a computational error.

Code	M5d - 1
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to solve measurement problems.
Item Descriptor	Length, capacity and weight: One unit; one-step conversion via multiplication or division.

Stimulus Attributes

1. The situation should involve a measurement of weight, capacity or length. The problem should be stated in sentence or shot paragraph form.

2. The problem should require the conversion of either (a) a measurement expressed in terms of two units to its equivalent in terms of the smaller of the units, or (b) a measurement expressed in terms of one unit to its equivalent in terms of two units.

3. Common abbreviations for customary units may be used. Metric units should not be abbreviated.

4. The nature of the conversion should be explicitly stated in the problem stem.

5. A one-step conversion should be sufficient to reach the correct solution.

6. If the conversion involves division, the measurement should be selected so that there is no remainder after one decimal place.

7. The measurements should be expressed as whole numbers.

8. A table including the conversion factors for the units involved should be provided.

9. All or part of the data may be presented in a chart or a drawing. If so, specific instructions such as "Refer to the drawing" should appear in the problem statement.

Response Attributes

1. Format:

   a. All choices should be expressed in terms of the unit (s) requested in the problem stem.

   b. Common abbreviations may be used to express English units. Word names should be used for the metric units.

   c. Alternatives should be right justified with respect to each unit and arranged in either ascending or descending order.

2. Four alternative responses:

   a. The correct answer.

   b. The result of not utilizing the smaller unit.

   c. The result of using the inverse operation in the conversion process.

   d. If the units are in the English system, the result of treating the smaller unit as a decimal equivalent (4.5 ft.= 4 ft. 5 in.). If the units are in the metric system, the result of using an incorrect conversion factor.

3. Another possible response:

   "None of the above" may replace either a,b,c or d. This alternative should appear as the fourth choice.

Code	M5d - 1a
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to solve measurement problems.
Item Descriptor	Length, capacity, and weight: two units; one-step operation with regrouping, addition or substraction.

Stimulus Attributes

1. The problem should involve finding either the sum or the difference of two measurements. The unit measurements may be either length, weight, or capacity. The problem should be stated in sentence or shot paragraph form.

2. Each measurement should be given in terms of two units. These must be reasonably related (e.g. lbs. and oz., not tons and oz.). Metric units should not be abbreviated.

3. Only one conversion step should be necessary to reach the correct solution.

4. A table including the conversion factor needed should be provided.

5. All or part of the data may appear in a chart or drawing. If so, specific instructions such as "See the drawing" must appear in the problem statement.

Response Attributes

1. Format:

   a. The choices should all be in terms of either one or both of the units used in the problem. Metric units should not be abbreviated.

   b. The choices should be right justified with respect to each unit and arranged in either ascending or descending order.

2. Four alternative responses:

   a. The correct answer.

   b. The result of using an incorrect conversion factor (e.g.,1 lb= 10 oz., ans. 11 lb. 6 oz.).

   c. The result of treating the units as two separate problems; in the subtraction mode, taking the smaller number from the larger; in the case of addition failing to record or "carry over" during the regrouping process.

   d. One foil should be the result of using the inverse operation.

3. Another possible response:

   "None of the above" may appear as the fourth choice replacing either a, b, c or d.

Code	M5d - 1b
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to solve measurement problems.
Item Descriptor	Length, capacity and weight: two or three-step problem combining operation(s) and conversion(s)

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation involving a measurement of either capacity, weight, or volume.
2. The problem should be solved by either: (a) 1 or 2 operations and one conversion, or (b) 1 operation and two conversions.
3. The major emphasis of the problem should be upon the conversion process(es). Thus the operational aspects should not involve unduly compiicated computation.
4. A table containing the needed conversion factors should be provided.
5. If the problem is intended to require two conversions then the table should not include a direct conversion from one unit to the other (e.g., if the problem requires a conversion from inches to yds., the table should not include 1 yd. = 36 in.).
6. The situation may require that the answer be rounded either to the nearest whole number or to one decimal place.
7. The situation may require a "sufficient" whole number answer rather than a mixed number.

Response Attributes

1. Format:
   a. The alternatives should be consistent with the item situation; either whole or mixed denominative numbers should be used.
   b. Choices should be right justified and ordered by either ascending or descending value.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should reflect a failure to make the final conversion step
   c. One foil should reflect either a misinterpretation of the problem or a failure to regard some of the information
   d. One foil should reflect the use of a wrong operation at some point in the computational processing

Code	M5d - 2
Skill	Basic Mathematics
Sub-skill	Demonstrates the ability to solve measurement problems.
Item Descriptor	Area and perimeter: application of formula.

Stimulus Attributes

1. The problem should present in a short paragraph a real world situation which requires the applicant to determine which of three rectangular dimesions will result in the greatest area for the least perimeter.
2. The data should be presented in the alternative choices.
3. Dimensions should be presented as 2-digit whole numbers which are multiples of either 10 or 5.
4. Metric units should not be abbreviated.
5. Dimensions for a square should not be included.

Response Attributes

1. Format:
   a. The dimensions should be presented as "_____by _____." Units of measurement should be given.
   b. The choices should not be ordered according to area size.
   c. Metric units should not be abbreviated.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should present dimensions which result in a perimeter equal to that in the correct answer and an area less than that in the correct answer.
   c. One foil should present dimensions which result in an area equal to that in the correct answer and a perimeter greater than that in the correct answer.
   d. The answer cannot be determined from the given information.

Code	MSd - 2a
Skill	Basic Mathematics
Sub-skill	Demonstrates an ability to solve measurement problems.
Item Descriptor	Area, perimeter, volume: application of formula and a conversion or one-step problem.

Stimulus Attributes

1. The problem should present in short paragraph form a real world situation which requires the applicant to find the area of a rectangle, the perimeter of a polygon (at most 8 sides) or the volume of a rectangular box in one unit; and to convert the measurement to another unit or solve a one-step problem.

2. The dimensions of the figure should be presented in a drawing. Each dimension should be a two digit whole number, except at least one dimension of a volume problem should not be a two digit number.

3. The problem stem should contain specific instructions referring the applicant to the drawing. Common abbreviation for customary units may be used. Word names should be used for metric units.

4. The solution of the problem should involve a conversion from a standard unit of measure (e.g. square feet) to another unit of measure (e.g. square yards (standard) or seating capacity (non-standard) or gallons of paint (non-standard).

5. The conversion factor should be presented in the problem stem.

6. The dimensions of the figure should be selected so that the product or sum of the dimensions is not a whole number multiple of the conversion factor.

Response Attributes

1. Format:

   a. All choices should be whole numbers. They should be right justified and arranged in either ascending or descending order.

   b. All choices should be denominate numbers specifying the result of the conversion.

   c. Metric units which appear in the responses should not be abbreviated.

2. Four alternative responses:

   a. The correct answer.

   b. One foil should be one more or one less than the correct answer reflecting incorrect rounding in the conversion process.

   c. One foil should be the result of using the wrong formula. For example, finding the perimeter rather than the area and then converting correctly.

   d. One foil should reflect only the application of the formula. For example, finding only the area of the rectangle.

Code MSd - 3

Skill Basic Mathematics

Sub-skill Demonstrates an ability to solve measurement problems.

Item Descriptor Elapsed time.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation involving the elapsed-time between two events.

2. The specification of each event should involve two units of time, (e.g., hours and minutes; years and months; weeks and days; or days and hours).

3. Except for a.m. and p.m. abbreviations, units should be written out in the problem stem (e.g., years, not yrs.).

4. The two events should not be specified in the same time cycle as determined by the nature of the problem. For example, 10 a.m. and 2 p.m. would be in different cycles for an hours-minutes problem but in the same cycle for a days-hours problem.

5. The specification of the events should be such that if an applicant elects to use a subtraction process to solve the problem, a regrouping from one unit to another unit will be required.

6. The specifications of the events should be such that the elapsed time should not exceed three time cycles as determined by the nature of the problem.

Response Attributes

1. Format:

   a. All choices should reflect a conventional method of specifying the time of an event in terms of units of time; common abbreviations should be used (e.g., 1:30 p.m., 1 hr. 30 min.)

   b. The numerical components of the choices should be right justified (by units) and arranged either according to time sequence or in ascending order according to length of time.

2. Four alternative responses:

   a. The correct answer.

   b. One foil should reflect an independent determination of the difference of each unit, thereby avoiding the regrouping step. For example, finding the difference between hours and difference between minutes as two independent problems.

   c. One foil should reflect an error in the subtraction process whereby regrouping is avoided by subtracting a smaller number from a larger number.

   d. One foil should reflect a misinterpretation of the problem or a failure to note a precise detail in the statement of the problem.

Code M5e - 1

Skill Basic Mathematics

Sub-skill Applies mathematical skills to solve real-world problems.

Item Descriptor Comparison shopping: best buy.

Stimulus Attributes

1. The problem should present in short paragraph form a common task involving comparison shopping.
2. The situation should present a choice between different ways to package a product.
3. The problem should ask the applicant to determine the choice with either the least or the greatest cost per unit.
4. The problem should not ask a question such as "Which is the best buy? unless "best buy" is explicitly defined in the statement of the problem.
5. The data should be presented in the alternative choices.

Response Attributes

1. Format:
   a. Each choice will provide the following data: the unit (item or measurement), the number of units, and the total cost.
   b. The number of units in the four choices should be different but have a common factor (p) other than 1.
   c. The total costs should be different.
   d. The numerical units and prices should each be right justified.
   e. The alternatives should be arranged randomly.
2. Four alternative responses:
   a. The correct answer. The number of units should not be the common factor (p). If a division process is used, the correct answer should be determined by examining either the first or second digit in the quotient.
   b. In one foil the number of units should differ from the number of units in the correct choice by the common factor (p)
   c. In one foil the number of units should be the common factor (p)
   d. In one foil the number of units should be a multiple of the number of units in a, b or c

Code	M5c - 2
Skill	Basic Mathematics
Sub-skill	Applies mathematical skills to solve real-world problems.
Item Descriptor	Sequence of money transactions.

Stimulus Attributes

1. The problem should present in short paragraph form a common real-world task which involves a sequence of money transaction.
2. The problem should involve at least two additive transactions and at least two subtractive transaction.
3. One of the subtraction steps should involve a whole number amount written without decimal places (e.g. $75, not $75.00); one should involve a dollar and cents amount (e.g. $396.58).
4. One of the addition steps should involve a whole number amount written without decimal places (e.g. $80); one should be a dollar and cent amount (e.g. $10.57).
5. At no point in the sequence of transactions should the amount be less than zero.
6. If the computational steps are performed in sequential order, each computation should require regrouping in addition or in subtraction.
7. The range of the transactions should be $1 - $1000.

Response Attributes

1. Format
   a. Alternatives should all be money amounts written in standard form with both dollars and cents.
   b. Alternatives should be right justified and arranged in either ascending or descending order.
2. Four alternative responses:
   a. The correct response.
   b. The result of treating either the subtraction or the addition of whole dollar amounts (or both) as a cents amount.
   c. The result of omitting one of the transactions.
   d. The result of reversing the transactions, i.e. adding rather than subtracting and vice versa.

Code MSe - 3

Skill Basic Mathematics

Sub-skill Applies mathematical skills to solve real-world problems.

Item Descriptor Rate.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world task involving a rate-time situation.
2. The product and one component should be given. The task should be to find the missing component.
3. The solution should be reached by a one-step division operation.
4. All data given should be whole numbers.
5. Numbers used should not exceed five digits.
6. The wording should explicitly state that an estimation or approximation is being requested. If appropriate, terminology such as "rounded to the nearest hour..." could be used.
7. Neither the decimal .5 nor .50 should appear in the exact answer.

Response Attributes

1. Format:
   a. All choices should be denominate numbers.
   b. Alternatives should be aligned according to the decimal point and arranged in either ascending or descending order.
2. Four alternative responses:
   a. The correct response should be rounded to the nearest whole number.
   b. One foil should be either 10 times or 1/10 the correct answer.
   c. One foil should be the result of the correct operation, but with the positions of dividend and divisor reversed.
   d. One foil should be the result of multiplying the two numbers.

Code M5e - 4

Skill Basic Mathematics

Sub-skill Applies mathematical skills to solve-real world problems.

Item Descriptor Average.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation which requires the applicant to find the average of a group of whole numbers.
2. Either four or five numbers may be used. One of these should be repeated. Zero may be used once-if appropriate-as it is in grades.
3. The numbers chosen should be consistent with a realistic situation. If data refers to measurements of length, weight, etc., no conversions should be required to find the average.
4. The numbers chosen should not exceed 3 digits. Neither should all the numbers be one digit numbers.
5. Regrouping should be required at least once during the addition.
6. The average of the numbers should not be a whole number.
7. The problem should require that the average be rounded to the nearest whole number.
8. The decimal part of the quotient should not be .5, .50, etc.

Responses Attributes

1. Format:

   Alternatives should be right justified and arranged in either ascending or descending order.

2. Four alternative choices:

   a. The correct answer.

   b. The result of rounding incorrectly. If the correct answer has been rounded down, then the foil will be one greater. If the correct answer has been rounded up, then the foil will be one less.

   c. One foil should reflect the result of using all the addends to obtain the sum but using a divisor which is one less than the correct divisor.

   d. The result of a failure to carry during the addition.

3. None of the foils should correspond to either the median or the mode.

Code M5e - 5

Skill Basic Mathematics

Sub-skill Applies mathematical skills to solve real-world problems.

Item Descriptor Ratio: two-step.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation involving ratio.
2. The ratio and the "total" quantity should be given. The problem should be the determination of one of the two parts.
3. The ratio should be expressed "_____ to _____."
4. The numbers used to express the ratio should be between 1 and 10. They should have no common factor other than 1.
5. The larger of the two ratio numbers should appear first.
6. The number chosen to represent the total quantity should be a multiple of the sum of the ratio numbers and a multiple of at least one of the ratio numbers. The number of digits in this number may range from 2 to 4.

Response Attributes

1. Format:
   a. The alternatives should be whole numbers.
   b. Choices should be right justified and arranged in either ascending or descending order.
   c. Denominate. numbers should be used when applicable.
2. Four alternative choices:
   a. The correct answer.
   b. One foil should represent the "other part".
   c. The result of treating the ratio as a fractional part of the whole.
   d. The result of performing only part of the necessary computation.
3. Other possible foils:
   a. The result of dividing the total by one of the ratio numbers.
   b. "None of the above" may appear as the fourth alternative, replacing d.

Code	M5c - 6
Skill	Basic Mathematics
Sub-skill	Applies mathematical skills to solve real-world problems.
Item Descriptor	Scale drawing.

Stimulus Attributes

1. The problem should present in short paragragh form a real-world situation which requires the interpretation of a scale drawing.
2. The data should appear in a scale drawing-a map, blue-print, or plot.
3. The applicant should be asked to determine an approximate measurement when given the scale and the drawing.
4. The measurement called for need not be a "straight-line" distance; it may involve a sum (of as many as three measurements), or a difference.
5. A fraction (either ½ or ¼) should be involved in the solution of the problem. Either the measurement should not be an exact multiple of the scale unit or the unit of the scale should be a fraction (e.g., ½" = 10 miles.)
6. The scale should be clearly presented. The unit of the scale should be shown with its corresponding value below it as:

   ⟝⟞
   1 cm = 10 meters.

7. The problem stem should contain specific instructions to refer to the drawing.

Response Attributes

1. Format:
   a. All numerical choices should be right justified and arranged in either ascending or descending order.
   b. Denominate numbers should be used when appropriate.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should be the result of using the wrong dimension(s).
   c. One foil should be the result of using the wrong scale.
   d. One foil should reflect a computational error.

Code	MSc - 7
Skill	Basic Mathematics
Sub-skill	Applies mathematical skills to solve real-world problems.
Item Descriptor	Purchasing with multiple orders.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation involving the purchasing of several items, some of which are multiple quantities.
2. Two of the purchases should be multiple orders.
3. The problem should require no more than four computational steps for its solution.
4. There should be no more than a total of 3 non-zero digits in both factors in each of the two required multiplication steps.
5. Some or all of the data may be presented in a chart. If so, the problem stem should specifically direct the applicant to the data source.
6. This problem may contain extraneous information.
7. This problem may require an approximate answer.

Response Attributes

1. Format:
   a. All choices should be money amounts aligned by the decimal point and arranged in either ascending or descending order.
   b. Commas should be used in all dollar amounts exceeding three digits.
2. Four alternative responses:
   a. The correct answer.
   b. One foil should be a dollar amount corresponding to the total number of items ordered.
   c. One foil should be the result of failing to include a single item order.
   d. If extraneous information appears in the stem, one foil should reflect the use of all or part of such information. If not this foil may be the sum of the money amounts appearing in the stem.
3. Another possible foil:
   Either b, c or d may be replaced by the result of associating the wrong quantity numbers with the prices.

Code	M5c - 8
Skill	Basic Mathematics
Sub-skill	Applies mathematical skills to solve real-world problems.
Item Descriptor	Percent: two-step problem.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation which requires the applicant to determine either (a) the percent of increase or decrease which reflects a difference between two given quantities or (b) the result when a given percent of increase or decrease is applied to a given base quantity.
2. The percent involved should be less than 1000% and should be a whole number percent.
3. The numbers should be chosen so that the result of the multiplication or division process contains no more than 3 non-zero digits.
4. This problem may involve a rounding process. If so, the stem must explicitly state how the answer is to be rounded, to the nearest dollar, tenth, etc.
5. If a rounding step is required, care should be taken that the last non-zero digit in an exact answer not be the digit 5.
6. All or part of the data may appear in a chart or table. If so, a statement in the problem should explicitly direct the applicant to the data source.

Response Attributes

1. Format:
   a. Alternatives should either be right justified or aligned by the decimal point.
   b. Choices should be arranged in either ascending or descending order.
   c. Denominate numbers should be used when appropriate.
   d. Commas should be used in whole number amounts having four or more digits.
2. Four alternative responses for case a:
   a. The correct answer.
   b. One foil should reflect the result of using the wrong quantity as the base.
   c. One foil should be the difference between the given quantities.
   d. One foil should be the result of dividing one of the given quantities by the other.
3. Four alternative responses for case b:
   a. The correct answer.
   b. One foil should be the amount of increase or decrease.
   c. One foil should reflect the result of either treating the percent as a whole number or misplacing the decimal point when converting to a decimal.
   d. One foil should be the result of dividing the base by the percent; this may also reflect an error in the placement of the decimal point.
4. If rounding is called for in the problem stem, the correct answer and the foils should reflect the correct rounding process.

Code	MSc - 9
Skill	Basic Mathematics
Sub-skill	Applies mathematical skills to solve real-world problems.
Item Descriptor	Visualizing the solution to a problem which satisfies a specific condition.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation for which there are several possible solutions to the basic task; however, only one of these solutions would satisfy a given requirement.
2. The computation involved in the solution should be minimal.
3. A drawing or figure which would serve as a model for formulating a solution to the problem should be provided. A specific statement in the problem stem should direct the applicant to the drawing.
4. The problem should contain extraneous information.

Response Attributes

1. Format:
   a. The choices should be right justified and arranged in either ascending or descending order.
   b. Denominate numbers should be used when appropriate.
2. Four alternative answers:
   a. The correct answer.
   b. One foil should reflect the result of using all or part of the extraneous data.
   c. One foil should reflect a solution to the problem which does not satisfy the specific requirement.
   d. One foil should reflect a common incorrect approach to solving the problem.

Code	M5e - 10
Skill	Basic Mathematics
Sub-skill	Applies mathematical skills to solve real-world problems.
Item Descriptor	Substitution in a formula.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation involving the application of a formula.
2. The problem should be solely the solving of the formula. No further conversions or computations should be required.
3. The formula and the values of all variables, except for the unknown, should be given.
4. If a geometric formula is used, a drawing of the figure with the appropriate labels should be given.
5. The unknown variable should be isolated on the left side of the equality sign.
6. At least 2 but no more than 4 computational steps should be involved in the solution.
7. The formula should be such that either parentheses or exponential notation is necessary to indicate a multiplicative step.
8. The exponents 2 and 3 may appear in the formula as powers of numbers less than 11.
9. All the variables involved should be whole numbers.
10. The constants (parameters) may be fractions, decimals, or whole numbers. If π is involved, its value should be indicated as 3.14.
11. No rounding process should be necessary in the computation.

Response Attributes

1. Format:
   a. All numerical choices should be right justified and arranged in either ascending or descending order.
   b. Denominate numbers should be used when appropriate.
   c. Commas should be used in all whole numbers exceeding three digits.
2. Four alternatives responses:
   a. The correct answer.
   b. One foil should reflect a procedure error relating to the mis-use of either the parentheses or the exponent,
   c. One foil should reflect a computational error,
   d. One foil should reflect a substitution error,

Code M5c - 12

Skill Basic Mathematics

Sub-skill Applies mathematical skills to solve real-world problems.

Item Descriptor Comparison shopping: alternate pricing.

Stimulus Attributes

1. The problem should present in short paragraph form a real-world situation involving an item which can be purchased either by price per unit measure (weight, length, volume) or by a multiple number of items.

2. The problem should be one of the following types:

   a. The item's price should be given for one way of purchasing the item (either price per number of units or price per unit measure). The problem should ask for the comparable price in the other way of pricing.

   b. Both ways of stating the price are given and the problem is to determine which is the more economical buy.

3. There should be one conversion involved; for example, ounces to pounds or milliliters to kiloliters.

4. A table containing the needed conversion factors should be provided.

Response Attributes

1. Format:

   a. Numerical alternatives should be right justified and arranged in either ascending or descending order.

   b. Denominate numbers should be used when applicable.

2. Four alternatives for type A, Stimulus 2:

   a. The correct answer.

   b. One foil should reflect the result of a reasoning error

   c. One foil should be the approximate cost of a single unit,

   d. One foil should be the result of a computation error,

3. Four alternatives for type B, Stimulus 3. (Any one of these may be the correct answer.)

   a. One alternative.

   b. The other alternative offered in the problem.

   c. "The two prices are equivalent".

   d. Cannot be determined from the given information.

4. If a reasonable approximation is called for, the foils should be such that the difference between each foil and the correct answer is large enough to prevent confusion of the choices.